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May 1986 VOLUME 5, NUMBER 1

FOURTH ANNIVERSARY ISSUE

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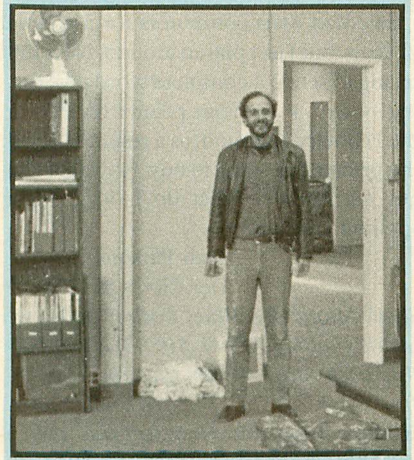
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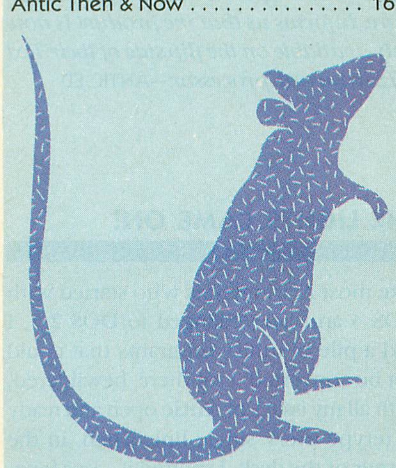
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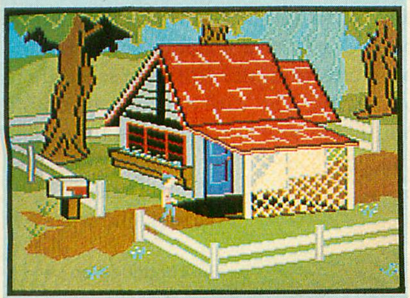
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Antic

The ATARI Resource

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MAY 1986, VOLUME 5, NUMBER 1

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VOLUME 1, NUMBER 10

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The ATARI Resource

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i/o board

HOLD ON TO THE DREAM

Ever since I purchased my first Atari computer, I've been fascinated with the idea of a computer that could interact with my lifestyle, (humble though it may be). In this way, Atari computers have provided a tremendous amount of enjoyment and satisfaction. So has **Antic**, by supplying a generous helping of pride of ownership that the old Atari company failed to generate, especially during 1984.

I know you have endured some tough times. I know, if it were not for **Antic's** perseverance, my hopes and dreams for my Atari computers would have faltered. With the emergence of the 520ST, I can sense a new aura of excitement that I'm sure you share. But still, I feel that the true potential market for a home computer has been overlooked.

For example, imagine a computer with a CD ROM that interfaced with a real-time clock/calendar and reminded people when and how to fertilize their fruit trees or change the oil in their cars, communicated with a database showing what's on TV tonight and monitored the home entrances while people were asleep or at work. Now in addition to the pleasure of owning an Atari 520ST, I can look forward to the next generation of Atari computers that will (hopefully) someday fulfill my wish.

Arthur Cofresi
Vacaville, CA

PARALLEL REFERENCE

The technical reference notes for the Atari 800, unfortunately, do not reference the parallel I/O port on the back of the 800XL. Where and at what price may I obtain the electrical and memory characteristics of this port?

Jon Stevens
Madison, WI

Where? In the four-part series Parallel Bus Revealed *in the January through April 1985 issues of **Antic**. The price? Free, if you already own these issues, $5 an issue from the Antic Catalog if you don't.*—ANTIC ED

PERCOM REPAIRS

Percom Data Corp. has turned over their nationwide repair contract to STS Computers, 1073 W. Broad Street, Falls Church, VA 22046. (703) 237-0558. STS advises you to call first before sending your drive.

ATARI WRITERS

I have had Atari computers for a couple of years, but I just played around. Now I'm trying to set up a complete word processing system. I saw your printer reviews in the February issue and, as a result, selected the printer I'm going to buy. Now that I've got AtariWriter—what do I do about a spelling checker?

Alan Parsons
Del City, OK

Spell Magic by Blue Collar Software (Antic Catalog AP144, $19.95) is compatible with Atari Writer files.The hard-to-find DataSoft Spell Wizard spell checker is also compatible. DataSoft Inc., which recently changed its name to HP Software, informs us that the product is now only available on the flip side of their Text Wizard word processor.—ANTIC ED

THE LIGHTS CAME ON!

Like most Atari owners who started with DOS 3 and later changed to DOS 2.5, I had a pile of utility programs that could not be converted. I sat there, bewildered, with all my issues of **Antic** open and ready to retype every single line. Then, in the corner of the desk, I spotted it—our long-ago retired 1010 recorder! Suddenly the lights came on. I booted the DOS 3 utilities and saved them to the recorder, then booted a DOS 2.5 disk, CLOADED the programs from the 1010 and saved them to the disk. The 1010 is no speed demon, but it sure was faster than all the typing I faced.

Donna Deuser
Carmel, Indiana

continued on page 8

Digitize Yourself



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A complete ready to run system for those without access to video equipment. This system includes Computer Eyes, Magniprint II+, a high quality B/W video camera, and a 10 ft coaxial cable with appropriate connectors. Only **$299.95**

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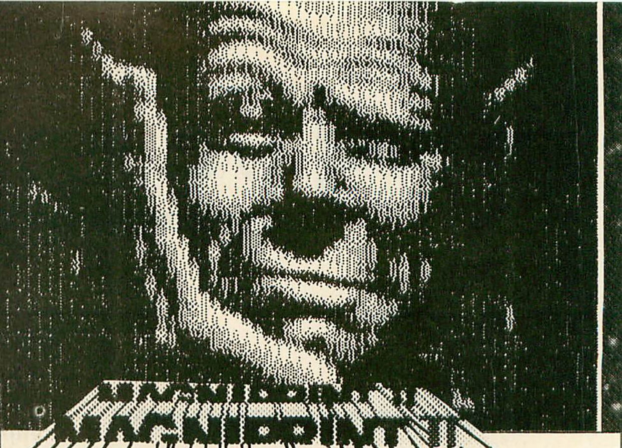
Digitize your picture with the perfect hardware/software combination: COMPUTER EYES and MAGNIPRINT II.+
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Computer Eyes lets you take any form of video input and saves it as a high-resolution graphics screen. You can use a video camera, VCR, TV output, video disk, other computers, etc. Now you can capture your picture, your friends or any video image and show it on an Atari computer. Computer Eyes is an innovative slow scan device that connects between any standard video source and your Atari computer (see the review in A.N.A.L.O.G. magazine).

- Do a complete Hi-Res scan in under 6 seconds
- Unique multi-scan mode provides realistic grey scale images in 24 seconds, and up for more detail scans.
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Now anyone can create the kind of graphics seen in this ad. When Computer Eyes is combined with Magniprint II+, you get unique capabilities that no other system can offer.

- Print your pictures in up to 19 different sizes, including poster sizes several feet across
- Print pictures with full shading for a level of realism even better than your TV screen
- Take your Computer Eyes images and modify them with your Koala Pad, Atari Touch Tablet, Micro Illustrator program, or Magniprint's special touch-up feature
- Works with Epson, Gemini, Panasonic, NEC, Citoh, and other compatible dot-matrix printers (850 interface or equivalent required)
- Supports all Magniprint II+ features



MAGNIPRINT II+

"Magniprint II is a versatile and powerful program which will meet most, if not all your print out needs."
ANALOG MAGAZINE

Print your Atari® graphics like you've never seen before!

The plus is in the shading — now Magniprint lets you print the highest quality reproductions of your screens available anywhere. It lets you choose the shading you want for the different colors and shades on the screen. It allows you to adjust the shades while your picture is displayed on the screen, so what you see is what you get. Magniprint prints the shades on your standard printer and paper by using specially designed dot patterns, yielding better looking output than you get on your screen.

This new feature is perfect for printing pictures from Koala Pad, Touch Tablet, Micro Illustrator, and others. It will amaze you when you print pictures from Computer Eyes or Strip Poker.

Now get your pictures shaded the way you want them

Magniprint II is the most powerful print utility available for your computer! It is the only software that can accurately print GTIA modes with 16 shades. pictures from PRINTSHOP*. Prints 19 different sizes from 1/8 page to giant wall sized posters. Prints across or down the page, regular or inverse, with a centering option. Works with printers compatible with NEC, CITOH, EPSON, & Gemini (850 interface or equivalent required). Accepts your own graphics creations or those created with Graphics Master*, Micropainter*, Fun With Art*, SYN Graph *, Atari Graphics Light Pen*, B/Graph*, Koala Pad*, Atari Touch Tablet*, Paint*, Strip Poker*, Graphics Magician*, and others • Includes many beautiful sample pictures • Does amazing graphics with your standard printer and paper • Special feature lets you modify pictures with your joystick • Add text to your pictures • Can convert a graphics mode 9 picture to a graphics mode 8 one (and vice versa) • Allows you to print the whole screen or any selected portion of the screen in multiple sizes • Includes HELP screen for easy use • Prints GTIA modes 9, 10, and 11 with 16 different shades. Fosters print along continuous sheets of paper which are attached together when done.

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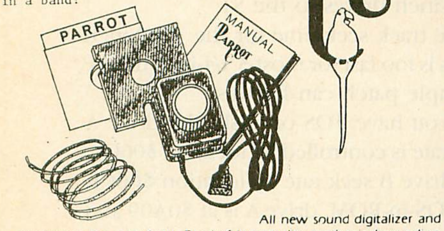
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DIGITIZE YOUR VOICE

PARROT...So good, It is being used by professional musicians in a band!

PARROT



All new sound digitalizer and synthesizer for your Atari. Tired of low-quality mechanical sounding voice output? Now you can make any Atari speak in your own voice. Tired of four tone sound? Now any Atari can play a whole orchestra complete with a singing choir. "The Parrot" digital sound synthesizer system lets you do all this and much more.

How it works — "The Parrot" system plugs into your joystick port and lets you record pure digital sound from your stereo, TV, microphone, or any other sound source. The special Parrot software lets you play back this high quality sound on any Atari system with no special hardware needed. It even lets you put this unbelievable sound right into your own programs, that will run on anyone's Atari. It also includes digital sequencer software that lets you turn your Atari into a synthesizer comparable to those costing thousands of dollars. Turn any natural sound into a musical instrument, or design your own custom sounds. Imagine playing a song with the sounds of a dog's bark, a chinese gong, a car's honk, your own voice, or anything your imagination can come up with. It turns your keyboard into an organ and lets you instantly switch between up to nine different digital sounds, each with three full octaves of notes. Recording time varies depending on available memory and quality level desired. You've got to hear it to believe it!!!!

THE PARROT digital input hardware and playback/synthesizer software with sample sounds and demos

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AT LAST A UTILITY THAT DOES IT ALL. Scans & Analyses ALL Atari® programs. Works on programs stored on: Disk, Cartridge or directly from memory • Converts complex machine language into readable assembler • Transforms ANY Atari® BASIC program into

NEW AND IMPROVED FEATURES!

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listable, modifyable BASIC • Changes a 4, 8 or 16K cartridge into a binary load file and source file that you can view & change using regular Atari® assembler. Clearly shows protection techniques such as: BAD SECTORS, BAD DATA MARKS, DUPLICATE SECTORS and FORCED CRC ERRORS. Even finds and displays hidden directories. No other program can do this!

NEW FEATURES: Now fully supports DOS 2.5 and includes one pass sector copier for 130XE owners.

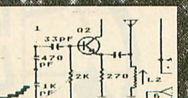
$29.95
Complete with instructions in theory and use.

IMPERSONATOR

CARTRIDGE TO DISK COPY SYSTEM

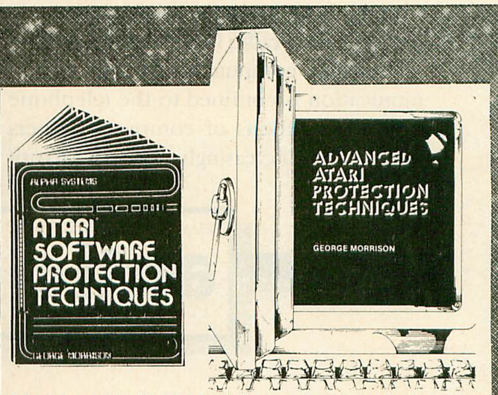
CARTRIDGE TO DISK COPY SYSTEM Yes, for only $29.95, you can make working copies of all your Atari computer cartridges (16K or less). Our special package will let you save your cartridges to ordinary disk files. They will run exactly like the originals when used with the Impersonator. Each disk holds up to 12 cartridge programs. Now you can put all your real cartridges away for safe keeping and use the Impersonator for everything. YES, IT REALLY WORKS. The Impersonator does everything the high-priced cartridge back-up systems do... and more. **ONLY $29.95**

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Schematic Designer is designed to help you create the electronic gadget of your dreams. Features 28 built-in symbols and the possibility of hundreds more, in high resolution graphics. You can add titles, zoom in and print out your schematics. SCHEMATIC DESIGNER includes many sample schematics which can be used to build many projects, including a working light pen.

SCHEMATIC DESIGNER ON A DISK... Only $24.95



BOOK I + DISK: (The Original) Thoroughly explains the techniques used by advanced software pirates, and the copy protection methods used to stop them. It offers clear and understandable explanations sophisticated enough for software writers of any scale yet easy enough for a beginner just wanting to learn more about Atari® computers. A MUST READ FOR ALL ATARI® OWNERS.

BOOK INCLUDES: • Duplicate sectoring • Custom disk formatting • Creating "BAD" sectors • Hardware data keys • Legal protection like copyrights, trade secrets, patents • Protecting BASIC programs • Self-modifying Code • ROM + EPSOM cartridges • Hidden serial numbers • Self-destructing programs • Freeware • Misassigned sectoring • Much, much more.

DISK INCLUDES: • Directory mover • VTOC scanner • Duplicate sector finder • Sector mover • Bad sector writer • Sector data displayer • Autorun builder • Other useful programs.

This comprehensive book and disk package should not be confused with low quality imitations offered elsewhere.

BOOK II + DISK II: Advanced Software Protection. This all new sequel starts where the highly acclaimed Book I leaves off. Book II is the most up-to-date resource available for the Atari® owner. Includes reviews and explanations of products such as: The Happy Enhancement,* The Impossible,* The Scanalyzer,* The Chip,* The Pill* and Super Pill* & many others.

Book II: Tells you specifically what they copy, what they won't, how they are used, and the details of how they work. Book II also includes such topics as: • Transmitting protected programs • Copying disks with more than 19 sectors/track. Includes the newest protection methods by companies like Synapse* AND Electronic Arts* • Data encryption • Phreaking methods • Program worms • Logic bombs • Bank-select cartridges • Random access codes • New trends in software law • Sample BASIC + Assembler programs • On-line security • And much more.

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*Denotes products not related to Alpha Systems

ALL PRODUCTS WORK WITH ALL ATARI 8 BIT COMPUTER SYSTEMS

i/o board

continued from page 6

COVERED

Mmmmmmmarvelous February cover! Finally a computer mag that **looks** like a computer mag. Thanks for growing up, **Antic**!

Anonymous
CompuServe
PPN# 74226,2404

OPEN THE AIRWAVES

Recently I sent a petition to the Federal Communication Commission requesting that they create a new radio communication service for owners of personal computers. It's my contention that owners of PC's should have access to the radio spectrum without having to learn morse code or pass a ham radio license examination.

Presently, computer-to-computer communication is confined to the telephone network. Millions of computer owners find that it is increasingly expensive to utilize this network to satisfy their communication needs.

I am advocating the establishment of a Public Digital Radio Service, permitting computer owners to communicate by radio. An infinite number of local area radio networks would be interconnected into a national packet radio network. This would allow computer owners to exchange messages, bulletins and other information by radio at no cost.

The FCC feels the petition might have merit, but if they do not receive a significant response from computer owners, they will conclude that the public isn't interested in this service. If you feel that computer owners should have a communicatons alternative, please show your support by writing to the Federal Communications Commission, Washington, D.C. 20554.

Don Stoner, W6TNS
6014 E. Mercer Way
Mercer Island, WA 98040

*For more information on computer/radio communications, see the November, 1985 issue of **Antic**.*—ANTIC ED

help!

HIPPOSOUND REVERSE

In the March 1986 ST Listings section, the two listings for *HippoSound* should be reversed. Listing 1 should be Listing 2 and vice-versa.

WIREBALL SMUDGE

The 23rd character in line 2360 of Listing 1 in Wireball (January 1986) got a bit smudged on the printing press. It's supposed to be an inverse, capital K.

TYPO II DOUBLE FEATURE

If you've had trouble typing in line 32025 from Listing 1 of the *TYPO II Double Feature* (November 1985, p. 58), fear not. Listing 2 of *TURBO TYPO II* (June 1985, p. 75) is a short program which will create that exact line for you.

ST-IBM HOOKUP

In reference to the November 1986 article by David Small about how to hook up 5 1/4-inch drives to the ST:

The track seek-time for the 3 1/2-inch drives is too fast for most 5 1/4-inch drives. A simple patch can fix this.

If you have TOS on disk, the drive A seek rate is controlled by location $06CB, and drive B seek rate by location $06CF. For TOS-in-ROM, drive A is at $0A09 and drive B at $0A0B. The default value for these locations is $03, which represents three milliseconds. If you're hooking up a 5 1/4-inch drive, change the value to zero—for 6 milliseconds.

Boot with the 5 1/4-inch drive active, then change the appropriate location for your configuration with SID, or some other memory utility—such as Holmes & Duckworth Toolbox. Seek rate values are: 00 = 6ms, 01 = 12ms, 02 = 2ms, and 03 = 3ms.

Antic would like to thank James H. Trageser, PPN #72407.3256 for uploading this information onto CompuServe. If you want more details, we recommend you download Mr. Trageser's full article, DSEEKR.TXT, which may be found in Data Library 0 of the 16-bit section on SIG*Atari.

antic online

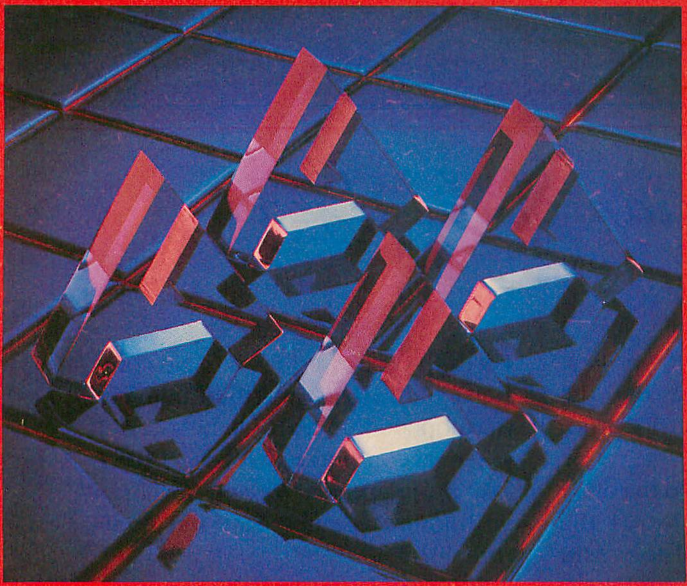
ANTIC ONLINE COVERS THE FAIRE

Type GO ANTIC when you log onto CompuServe in April. This month on ANTIC ONLINE you'll find in-depth coverage of Atari news from the West Coast Computer Faire. And every month ANTIC ONLINE brings you the fastest and most detailed reporting of significant events in the Atari community.

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If you're not a CompuServe subscriber yet, see your local computer dealer or phone (800) 848-8199 for information about signing up. Ohio residents phone (614) 457-0802. There is no extra charge for accessing ANTIC ONLINE.



Antic Awards
FOR ATARI ACHIEVEMENT

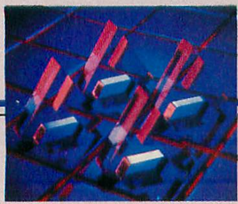
by NAT FRIEDLAND, Antic Editor

Atari computers first came on the market in 1980, so it almost seems strange that until now, nobody has ever presented awards for outstanding contributions to the Atari user community.

We had been thinking about doing this for quite a while. And when we were trying to figure out something special for this anniversary issue celebrating the start of Antic's fifth year of publication—we took a deep breath and said, "Now is the time."

Actually, this is a very fitting time to unveil the Antic Awards. The Atari Corp., the Atari user community and Antic itself are all stronger than ever—after coming through a dramatic computer industry shake-out that saw many once-powerful companies shutting their doors.

The 1986 Antic Awards For Atari Achievement provide a welcome chance to thank some of the key people who helped bring the Atari user community through the shake-out of 1984-85—with an outlook and products that are more sophisticated and exciting than ever!



Atarian of the Year

JACK TRAMIEL



For the **Antic** equivalent of the "Best Picture" Oscar, who else but the Chairman of the new Atari Corporation?

Jack Tramiel spearheaded the drive that made the Commodore 64 the best-selling computer in history. And since he switched to Atari on July 2, 1984, he has shown no sign of losing his victorious ways.

Delivering on the corporate slogan of "Power Without the Price," Tramiel's aggressive new Atari team swiftly created and brought to market the most powerful 8-bit Atari computer, the **130XE**. And then Tramiel's Atari opened up a whole new era of personal computing with the **520ST**—a programmers' dream machine with unprecedented power at an affordable price.

Feisty and controversial, yet capable of inspiring great loyalty from longtime associates, Jack Tramiel has made a career of achieving spectacular results by living up to his famed credo, "Business is War." We're glad he enlisted on Atari's side now!

Lifetime Contribution Award

OPTIMIZED SYSTEMS SOFTWARE

When it came to honoring someone for consistent major contributions to Atari users over the years, Bill Wilkinson and his Optimized Systems Software Company were the first choice of everybody at **Antic**.

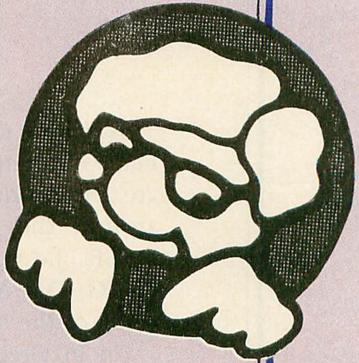
Wilkinson programmed Atari's excellent first Disk Operating System and BASIC, after designing the early DOS for Apple computers. Wilkinson Atari DOS versions are still the best, as seen in his most recent **DOS 2.5**.

Meanwhile, Wilkinson's OSS company has produced an unprecendented line of outstanding software tools for the serious Atari programmer. These tools include: **MAC/65**, the indispensible machine language assembler; **BASIC XE**, the impeccable successor to **BASIC XL**; and **ACTION!**, one of the most satisfying programming languages ever created for the Atari. **Personal Pascal**, the latest hit from OSS, is reviewed in this issue.

Wilkinson and OSS have been in the forefront of providing helpful customer service, and Wilkinson's longrunning column in Compute Magazine has helped thousands of Atari programmers learn the machine.

Outstanding Contribution Award

BATTERIES INCLUDED



At a time when many other major software publishers were deserting the Atari, Batteries Included brought out a series of deservedly successful breakthrough products for Atari Computers.

First came **HomePak**, the low-priced integrated software package featuring the widely used HomeTerm telecomputing program. Next was the **PaperClip** word processor, crammed with sophisticated features—and in fact the software with which this article is being written. Now there's **DEGAS**, the brilliant paint program that showcases the full graphics power of the 520ST.

Batteries Included has been a good friend to the community of Atari users, providing a line of innovative, imaginative software at fair prices.

Outstanding Contribution Award

DIGITAL RESEARCH, INC.

The Atari 520ST computer would have created much less excitement at its release if it didn't have the state-of-the-art multiple window environment of Digital Research's **GEM** interface.

GEM's mouse-controlled icon desktop simulation is a visual operating tool designed to work on a wide variety of computers. Because of this, the comparative ease of rewriting successful programs to run on the STs brings great hopes for achievement of a large base of ambitious ST software in the near future.

Engineering Award

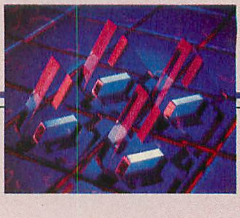
SHIRAZ SHIVJI



As Atari's Vice President of Research & Development, Shiraz Shivji led the team of six engineers who successfully designed the 520ST computer in an unprecedentedly short time of five months.

Among the many technological breakthroughs of Shivji's 520ST team was lowering the cost of producing high band-width video monitor technology down to far less than what it had previously been.

Shiraz Shivji and the rest of the Atari Corp. engineers succeeded at a heroic task in creating the prototype 130XE and the 520ST during the hectic summer and autumn of 1984.



Outstanding Users Group

EUGENE ACE

This was a tough call, because so many outstanding Atari users groups are active today. To name just a few around the U.S.—WAACE, SLCC, MACE, JACG, BAAUG, MILATARI, DAUG, DAL-ACE and ABACUS are some of the best.

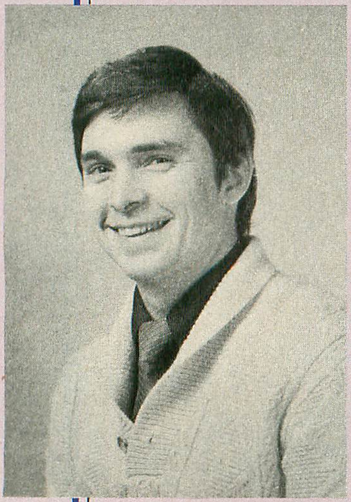
Up in Oregon, the Eugene Atari Computer Enthusiasts are one of the strongest users groups around—and they have been in the forefront longer than just about any other group.

The highly regarded Eugene ACE newsletter earned an international reputation by premiering many outstanding public domain programs over the years. One example that comes to mind would be the action games of Stan Ockers—whose programs are published by this Oregon club even though he lives in Illinois.

The Antic Award for Outstanding Users Group goes to Eugene ACE as fitting representatives of the spirit of free information sharing, enthusiasm and good fellowship typical of the best of the Atari users group movement.

Outstanding Antic Contributor

MATTHEW RATCLIFF



Another tough pick. In four years of publication, **Antic** Magazine has printed the writing of many outstanding Atari programmers. Some of our most reliable high-level contributors include David Plotkin, Paul Chabot, Karl Wiegers, Chris Chabris, Patrick Dell'Era, J.D. Casten, David and Sandy Small, Carl Evans, Jerry White, Ken Harms, Suzi Subeck and many more. . .

But in 1985, Missouri programmer Matthew Ratcliff was really on a roll—publishing four major **Antic** programs on a remarkable variety of subjects. In March, he delivered the powerful printing utility *Custom Print.* Following in August was *Atari 'Toons*, an ambitious animation program that we featured in a popular contest. In September, it was the innovative *Revision C Converter* that debugged a longstanding problem for many users of Atari BASIC Revision B. Then in December, *BBS Crashbuster* was a valuable safeguard for bulletin board sysops needing protection against destructive system-crashers.

In 1986 **Antic** readers can expect more from Mat * Rat (his online ID)—and from many of this magazine's other valuable contributors.

Outstanding Product Award

COMPUTEREYES

Digital Vision, Inc. wins an Antic Outstanding Product Award for Innovation.

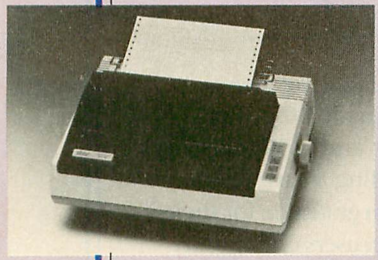
The company's **Computereyes** video digitizing hardware-software ($129.95) provided a jolt of excitement for the Atari community when it appeared last autumn. Online and at users groups meetings, Atari owners couldn't stop talking about the spectacular screen images created by Computereyes. The **Antic** technical staff was virtually incommunicado for the first week after Computereyes arrived—as they created digitized portraits of everybody in sight.

Computereyes exemplifies the excitement that comes when a unique, inventive product appears at the right time.



Outstanding Product Award

STAR SG-10 PRINTER



The **SG-10** dot matrix printer from Star Micronics wins an Antic Outstanding Product Award for Value.

Available in the stores for not much over $200, the easy-to-use SG-10 is packed with features rarely found at this price range—including a near letter quality mode that is hard to tell apart from daisy wheel printing. The **Antic** staff works with many printers and the solid, dependable SG-10 is just about everybody's favorite around here. Atari owners also ranked the SG-10 very high in our February, 1986 printer survey.

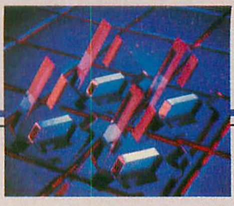
Outstanding Product Award

INFOCOM

Infocom, the pre-eminent publisher of all-text adventure software, wins an Antic Outstanding Product Award for Consistency of a high-quality product line.

We never met an Infocom adventure game we didn't like! When you purchase a Infocom text adventure in its elaborate packaging, you know just what to expect. You'll get many hours of thought-provoking enjoyment from a challenging (to say the least) series of puzzles within an intriguing and often humorous interactive storyline. And the "parser" software that interprets your English commands for the computer will be state-of-the-art.

Infocom adventures are written in a proprietary programming language designed for fast adaptation to any brand of microcomputer. (Absence of graphics helps here too.) Therefore, Infocom became the first major software publisher to release completed products for the 520ST.



Pioneer Technology Award

ACTIVENTURE

The Antic Outstanding Product Award for Pioneer Technology goes to Activenture for their breakthrough 540 megabyte CD ROM system. Activenture put an encyclopedia on a compact laser disk that the Atari 520ST could access for any entry in just about three seconds.

Although Activenture's CD ROM technology has been fully operational since the June, 1985 Consumer Electronics Show, Atari decided to hold back on releasing the product until the price of CD ROM players gets lower. But when the ST hookup to CD ROM reaches the market, it is likely to revolutionize the way that personal computer owners can make use of vast information libraries.

Honor Roll of Retailers

We had every intention of giving an Antic Award for Outstanding Atari Retailing. But when we looked back through four years of magazines, it seemed impossible to choose just one or two of the dozens of dedicated dealers who have sold Atari hardware and software through the years.

Instead, **Antic** made 50 posters of this issue's cover and will present them to outstanding Atari retailers around the U.S.—in gratitude for their services to the Atari users community.

Consistent Support Award

MICROPROSE

Throughout a period when few software publishers were creating new Atari products, MicroProse provided an ongoing succession of high-quality releases in their specialties. Operated by aviators turned Atari buffs, Microprose first earned success for flight simulations such as **Solo Flight** and **F-15 Strike Eagle**.

However, the company continues to successfully explore new areas with ambitious simulations like the submarine warfare of **Silent Service** and the air traffic control center of **Kennedy Approach**. And MicroProse's fast-moving strategy games such as **Conflict In Vietnam** have won strong praise too.

HOW THE ATARI COMMUNITY & THIS MAGAZINE GREW UP TOGETHER

ANTIC THEN & NOW

by GIGI BISSON, **Antic** Assistant Editor



Antic publisher Jim Capparell: "The fact that Atari users were always underdogs helped unify us."

Photography by Lorraine Capparell

It's 1972 in a garage somewhere in Sunnyvale, California. Nolan Bushnell's fledgling Atari Co. builds a video game machine called Pong, and installs it in Andy Capp's, a nearby Silicon Valley bar. The only instructions: "Avoid missing ball for high score."

"As a matter of fact, I saw that first Pong game," James Capparell recalls. "I dropped in there one Friday afternoon with a bunch of other programmers. When we saw the Pong game, the only thing anyone said was, 'Could *you* do that?' We discussed it from the programmers' side and the engineers' side. But none of us said, 'Boy, there's a real business in that.' Nobody saw the potential. But Nolan saw it. Nolan was the believer."

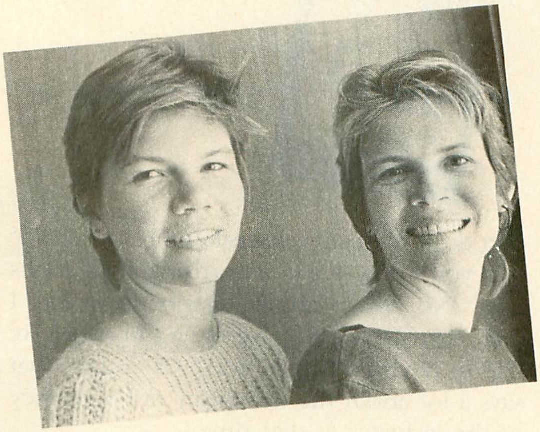
The computer industry belongs to believers. How could anyone have imagined that someday a Pong machine would lead to a cartridge game machine installed in 17% of the homes in the United States and then, in 1980, to the Atari 800—the most advanced home computer of its day?

Jim Capparell, now the publisher of **Antic** Magazine, tells me this story as we sit around his big desk at **Antic**. The office is cluttered with high-tech gadgets, books, magazines and an Atari 520ST computer. Jim talks excitedly, his face animated. He often tilts his chair back towards the tall window opening onto the fire escape.

It's 1980 and the choice of home computers is slim. An Altos 8000-2 costs $2,895. A Zenith Z-89 is $2,149. An Apple II with 16K and a disk drive is $2,020. A TRS-80 Model I is $1,500. A Commodore Pet system is over $4,000.

The Apple II was designed by Steve Wozniak in a garage, but Atari spent millions developing its first computers. And when the Atari 800 was released, it was clearly superior to anything else on the market. "The Atari had more silicon chips than any other computer at the time and more silicon translated into more power," Jim says.

Better yet, Atari had Star Raiders. Burned into 8K of imperishable ROM cartridge, it was the first program that showed all of the Atari computer's audio and visual capabilities. It was just a game, yes, but it revolutionized the idea of what a personal computer could be made to do.

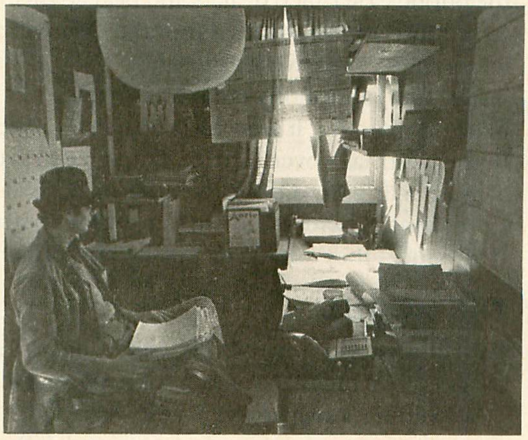


In those days, power had a price. An Atari 400 with 8K of memory, a flat membrane keyboard and a 410 cassette recorder cost $458. The Atari 800, with a real keyboard, 16K of memory and an 810 disk drive cost $1679.95. Jim Capparell wanted one.

As a NASA programmer doing experimental biofeedback research, Jim wrote to Peter Rosenthal at Atari, asking about the possibility of getting a research grant. "I proposed to use the Atari for real-time physiology displays in adjunct with the DEC PDP-11 computer I used at work," he says. Atari, Inc. offered him an Atari 800 for research purposes.

His interest in the Atari grew rapidly and he founded ABACUS, one of the first Atari users groups, in Marin County, California. The idea for starting a magazine devoted to Atari computers was already forming in his mind. As Jim tells the story, he left NASA on January 15, 1982 and started **Antic** that same day. Why start a magazine? "It's hard to explain, but there was no doubt in my mind that it was possible," he says. "It made sense. We were part of the audience that we served."

by Linda Tapscott



THE ATARI RESOURCE

For **Antic**, it started here. Picture the heavy, clunky, handmade, wooden kitchen table in Jim's turn-of-the-century apartment on Potrero Hill, high above the city. From the street, you could see the fog curling over San Francisco's old industrial area, now gentrifying as the downtown financial district pushes South.

"When Jim said, 'Let's start a magazine,' I said, 'Sure, why not? Then I got second thoughts—I had less than a year of production experience. In a way, I was terrified," recalls Marni Tapscott, the slim, soft-spoken co-founder and art director of Antic Publishing. "I would never have imagined then that today, four years later, I would be sitting in this office and making a real salary and producing two magazines," she says. "But we did it."

Jim says, "We were sitting down to breakfast one day and having blueberry pancakes and Marni said, 'What about a computer name? You know, like BYTE.' And so that got me thinking about computer stuff and out popped ANTIC—short for Alpha Numeric Television Integrated Circuit, which is one of the 8-bit Atari special chips." Marni said, "Let's make the letters sort of like they're dancing across the top of the page." And within minutes she had the cockeyed **Antic** logo.

At the next ABACUS meeting, Jim announced he would be starting a magazine and asked for volunteers. Robert DeWitt stood up.

DeWitt, who had a journalism background, was fresh out of Control Data Computer Institute and looking for a programming job. "Jim said he was starting a magazine, I said I'd help for free—which was a good thing, because he didn't have any money to pay me," he says. DeWitt is a complement to Jim. Where Jim is energetic and intense, DeWitt is methodical and mellow. But they had one thing in common—Atari. "Jim had never been in business before. I was new to business, too. But not knowing any better, you'll do things that nobody would ever try. People said it would take a quarter of a million dollars to start a magazine. Well, Jim didn't even have his rent money that month."

"I called advertisers cold." Jim says. "I told them, 'I have a magazine, would you like to buy ads.' Out of the blue. They had no idea who I was. But my uncle, an attorney with computer industry contacts, said, 'Enthusiasm—and I hear it in your voice—makes up for everything.'" Jim sold over $5,000 worth of ads for a non-existent magazine.

"One advertiser I called asked, 'Have you



Four years later, the founding staff members are still here: (Left) Les Torok working in Jim's apartment. (Top) Linda and Marni Tapscott. (Above) Robert DeWitt: From enthusiast to editor.



ever dealt with advertisers before?' I said 'No.' 'Do you know what advertising copy looks like?' 'No.' 'Do you have distribution?' And I said, 'No.' He said, 'Give me a full page.' He had to pay in advance, too." Of course, that says a lot about the optimism and buoyancy of the industry at that time.

Many of those first advertisers also began life as kitchen table operations. Broderbund, Optimized Systems Software, Adventure International, DataSoft and particularly Synapse, played an important role in **Antic's** success as they grew.

Another early supporter was Sierra On-line, a rapidly growing company then known as On-Line Systems and running out of programmer Ken William's house in the Sierra foothills. John Williams, Ken's younger brother and now vice president of the company recalls, "I remember what Jim said when he was starting **Antic**. 'The Atari is the real home computer. We're tired of just hearing about the winners—we're going to write about the little guys too.'" Online Systems bought the back page of the first issue. "To a certain extent, the Atari enthusiasts were renegades," Williams says.

At the end of March, 1982, the first issue of **Antic** debuted at the West Coast Computer Faire in San Francisco. Jim and DeWitt crammed 1,500 copies of the new magazine into Jim's Subaru and lugged them through driving rain down the long ramp into Brooks Hall—where about 300 copies got sold. "It wasn't the great success we had hoped for," DeWitt says.

"I don't know what I thought would happen," Jim says. "But there we were, stuck with 12,700 of the 13,000 magazines I had printed."



Issue number one (top) "Some of us are computer professionals," Jim Capparell wrote in his first editorial, "And some of us are what I've come to call Atari professionals—very motivated users." By issue seven, (above) it was a full-color monthly. (Below) Atari advertisement circa 1982: Power had a price.

THE WALL

'When I walked into Jim's apartment I saw 120 boxes of magazines stacked to the ceiling in the little living room," says Les Torok, **Antic** employee #4. "We never thought we'd see the end of that first issue." A musician, a film and writing student, Les became Circulation Director.

Eventually that stack of magazines became known as "The Wall of Torok." But as the stack grew smaller, it became a visual representation of sales. "When Jim or I got an order we'd yell, 'All right! I've got 10!' or 'I've got 15!' across the room," Les says. By the fourth issue, 580 checks arrived in one day. Within six months, the first issue sold out and became a collectors item.

For the first month, Les's office was a corner of the room where he worked on a large pillow with his legs crossed, filling out order slips. "It was like an MBA education in 30 seconds," he says. There were no names. No lists. He got the yellow pages for every computer store listing in the nation and copied them down. "Then I spent the next 1 1/2 years on the phone." He called dealers and begged them to sell just 10 magazines a month. "We were totally naive, but we learned fast."

The first bi-monthly issue was 30 pages. By issue number five, it grew to 112 pages. For the first Christmas cover, **Antic** contracted artist Tim Boxell, who did the Synapse package illustrations. There was a small problem with that issue—they forgot to put on the price.

THE MOGUE

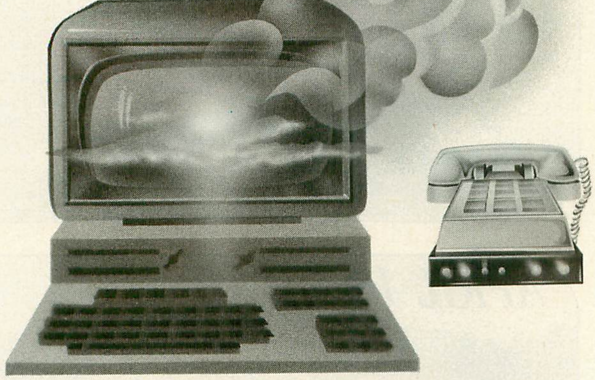
For the first year, everybody called Jim "the Mogue," for mogul. It was a joke, of course. "We weren't a big power in the Atari field," DeWitt says. "Atari didn't take us seriously." But Steve Ross, chairman of Atari's parent com-



continued on page 21

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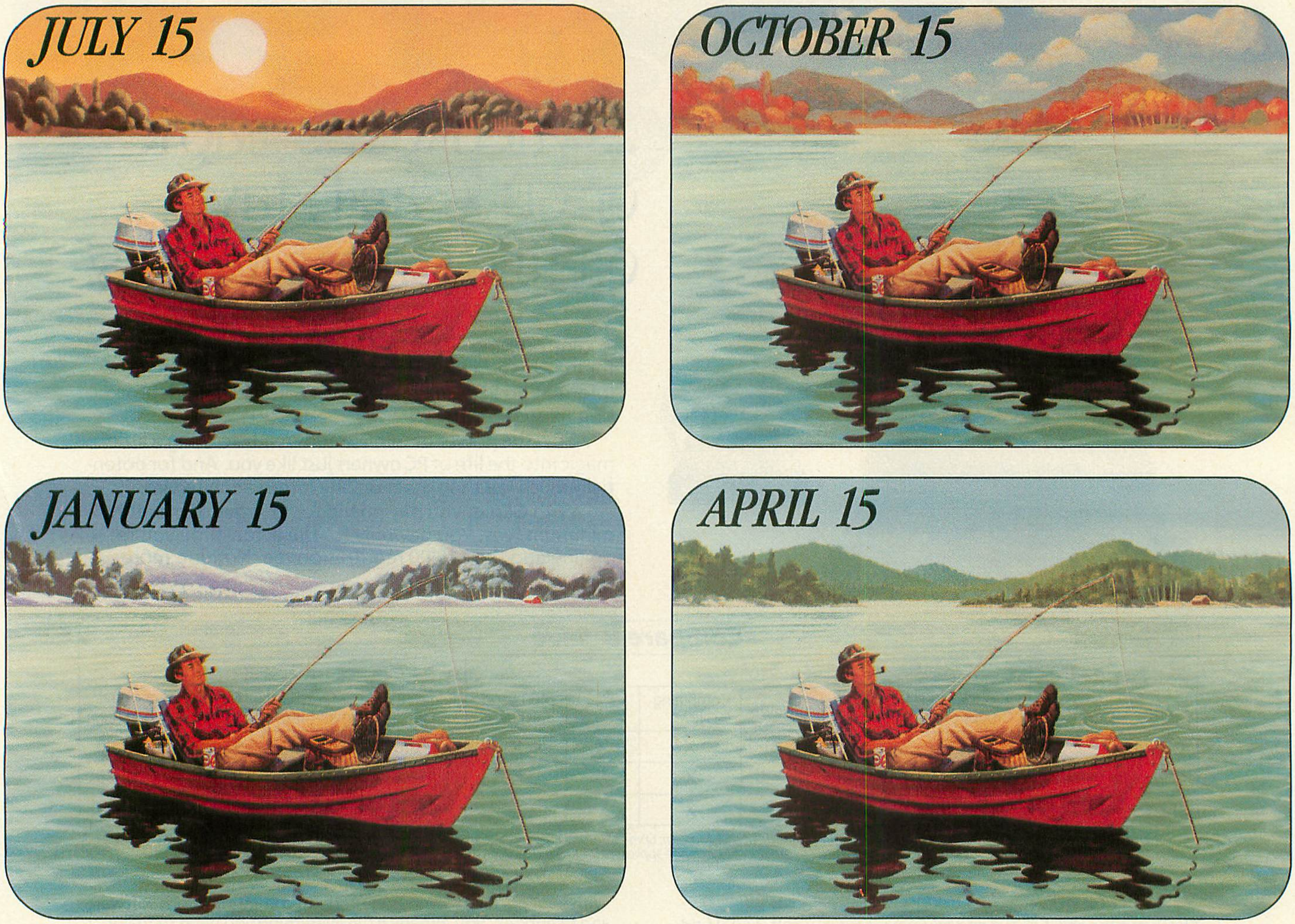
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pany, Warner Communications, did. He sent a note with a personal check for a subscription.

"Atari hardly noticed us at first. They were business people—we were enthusiasts. We were like the poor cousin who didn't get invited to the wedding," Jim says.

Atari, Inc. was now the fastest-growing company in U.S. history, with sales peaking at $2 billion. 1982 was the year of the Pac Man, and people were dropping $5 billion worth of quarters into arcade machines worldwide. With Ray "The Czar" Kassar at the helm, more than 15 million 2600 game machines had been sold.

Atari was synonymous with videogames, and by comparison the 400/800 personal computers went almost unnoticed. The computers were never a big moneymaker for Atari—some say they never made any money at all. But eventually, Atari quietly sold more than 1.5 million 8-bit computers.

VOLUME 2, NUMBER 1

In January, 1983 **Antic** moved a few blocks down the street to an office above a sleazy bar across from the port in San Francisco's China Basin area. Phil the bartender often had fights with the patrons. The cops hung out. "Some pretty ripe language floated up into our office." DeWitt says. "Accounting was still so bad we didn't know if we were making it or not."

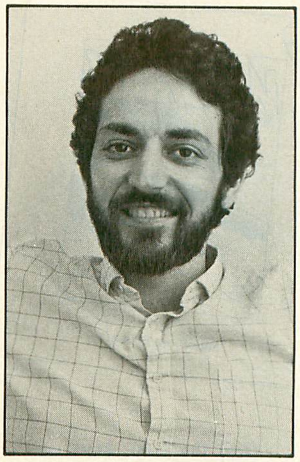
A former San Francisco Boat Works employee was brought in as Senior Editor. He arrived with a truckful of furniture, including fancy paintings of yachts. "On his first day we had a staff meeting and he ordered an iced tub of beer brought up from the bar," DeWitt says. "Then he pulled a baseball out of his pocket and said, "We're playing hardball now." He didn't last very long.

1983 is another good year for Antic, software companies and dealers. But trouble is beginning to brew at Atari as corporate spending still runs wild, and the videogame craze cools. Stock in Warner Communications, Atari's parent company, falls from $54 a share to below $30 in seven days. By March 1983, Atari has its first wave of layoffs—1,700 employees get the axe. Feeling the heat from the Commodore 64, Atari releases the 1200XL, a computer with software compatibility problems that killed it in less than a year. Then Atari announces a new computer, the 1450XLD, with a built-in double sided drive, modem and voice synthesizer—but never releases it.

Gary Yost was a hardware enthusiast. He'd earned a sound engineering certificate and he had worked the mixing board on a major rock tour. Knowing that he was about to enter the hospital for experimental surgery on an extended and possibly fatal illness, he wrote a letter to Atari president Ray Kassar. He offered to donate his time for the entire year that he expected to be bedridden. He ended the letter: "Is there still a Santa Claus?" Atari's public reputation was far from altruistic, so it was all the more shocking when Santa Claus made a delivery.

An enormous 6×4 foot box arrived. Literally, everything was inside—an Atari computer, software. As an Atari Foundation Fellow in educational research, Gary was put to work doing testing and market evaluation of the Plato Learning Phone system. "I was blown away by the Atari technology, but I didn't know what to do with it," Gary says. Atari referred him to Jim Capparell. During his time in the hospital, Gary and Jim developed a telephone friendship without meeting each other in person. Gary, who is married and has a daughter, joined the **Antic** staff in April, 1983.

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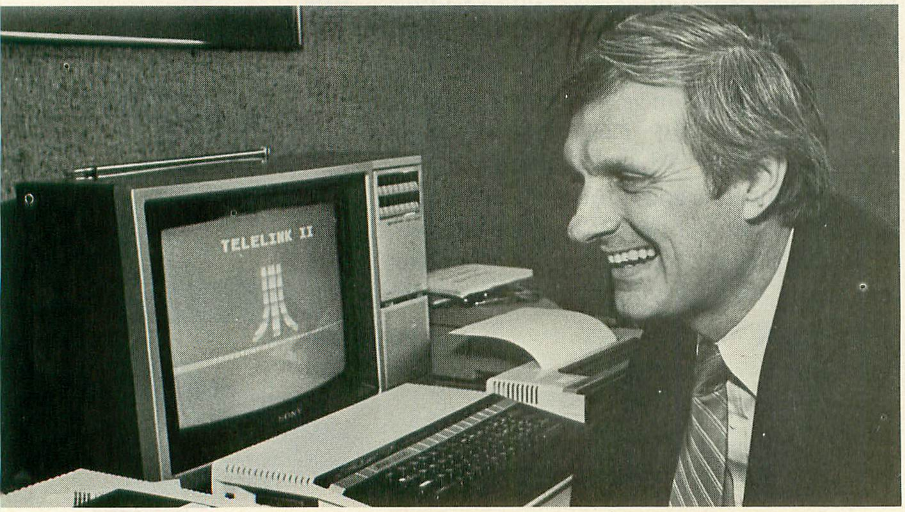


1982 was the year of the Pac Man and spectacular Atari profits as the world gobbled over 15 million game machines. (Above) Antic Marketing Director Gary Yost.

ANTIC THEN & NOW



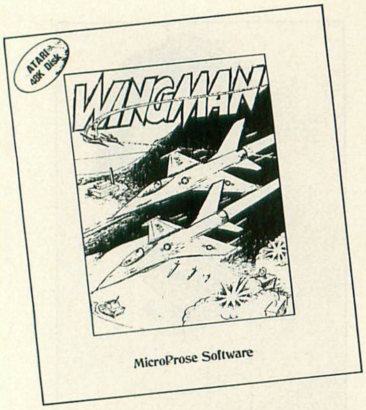
In July 1983, Ray Kassar resigns, and James Morgan is brought in as president. The price of the Atari 800 drops to $165. At the June Consumer Electronics Show, Atari announces the 600XL and 800XL computers and signs television star Alan Alda to promote the new models with the slogan, "We made them smart enough to know you're only human." However, Atari continues to lay off employees and loses $450 million that year.



Christmas, 1983 was **Antic's** largest issue—148 glossy pages. Early in 1984, the magazine moved several blocks closer to downtown to the current offices, in a bright, spacious, renovated loft building that formerly housed a dress manufacturer. The kitchen table was retired to the apartment of Linda Tapscott, Marni's younger sister who had joined the art department as **Antic** employee #5.

Then DeWitt burned out from editing **Antic**. He bought a mobile home and went to Baja. "It really freaked us out." Jim says. "DeWitt was always the stable and organized editorial genius. I needed someone who can follow up." He brought in Nat Friedland, a former Billboard music journalist.

In February, 1984, Jack Tramiel, who built Commodore Business Machines from a typewriter shop into a $1 billion industry, resigns from Commodore and mysteriously disappears for four months. In July, 1984, Tramiel resurfaces in Sunnyvale, buys Atari, Inc. for $240 million, changes the name to Atari Corp. and rocks the industry.



(Top) The 2600: Atari was plagued with a game machine image. (Middle) Desperate to compete with the Commodore 64 and Apple II, Atari releases the XL computers and signs on M*A*S*H star Alan Alda to promote them. (Above) Before the advent of slick boxes replete with posters and space fluff, most software, like this early Microprose release, was simply packaged in Zip Loc bags.

It was a new chapter for the industry, Chapter 11. Bankruptcy. "Advertisers were going out of business—our ad sales dropped 50 percent in 90 days. Advertisers didn't pay us. But we never had to lay off a single employee." Jim Capparell is proud of that. "We just had to learn how to do better business."

Nobody knew what was going to happen next. "So what," Jim says, "without enthusiasm, having lots of money to throw at a project can just be a detriment, because you stop thinking creatively and just start thinking more money will help." Enthusiasm was put to a brutal test.

In order to get through the lean period, Jim and the **Antic** staff came up with a number of unusual magazine business innovations. They started the **Antic** Action Edition, the magazine packaged with a disk containing all the programs from the issue. Then came ANTIC ONLINE, an electronic magazine on CompuServe that covers Atari news much faster than a monthly publication could. **Antic** kicked off the Worldwide Users Network (WUN), an alliance of Atari users groups.

The magazine's series of public domain disks expanded into today's 40-page Antic Catalog under Marketing Director Gary Yost. "The catalog started as an experiment," Jim says." But it kept the magazine afloat through the lean year and has now grown to more than 250 products.



At the January, 1985 Consumer Electronics Show, like a phoenix rising from the ashes of charred silicon chips and faded dreams, the Atari 520ST computer is born. If the Atari 800 was the Apple II reincarninated and improved, the ST was the Apple Macintosh done one better. The industry promptly calls it the "Jackintosh." The users start calling Tramiel "Uncle Jack."

Unbelievably, the price of this 520K high-resolution super-Mac was less than the original Atari 800 with 16K memory. Suddenly the spirit of computing's early days returned, with a host of new believers and entrepreneurs. **Antic** Associate Editor Jack Powell was assigned to start the **ST Resource**, a magazine within a magazine.

In 1983, over 450 different computer magazines clogged the shelves. After the 1985 shakeout, only a fraction remained. It was a crazy time to start a new magazine. But in April, 1985, Jim coaxed DeWitt back to start **II Computing**, a new magazine for Apple II users. With another magazine under the roof, the staff mushroomed. Pinstripes began to encroach upon **Antic's** casual bluejean style as financial and accounting professionals moved in. At one point, new staffers were forced to put their desks in the front lobby.

Four years. It's an eternity in **Antic** time. As we celebrate our fourth anniversary, 3.5 million copies later, the office is still a cacaphony of computer game blips and crashes, screeching printers, crying babies and incessantly ringing phones with readers on the line asking questions. Computer executives often visit the office, as well as gangly, nervous 17-year-old programmers demonstrating their newest software. Hundreds of letters pour in weekly. Some are new products and software that will be opened like special Christmas presents, others are pleas from confused Atari users for help and guidance.

Over the years, **Antic** contributors included well-known Atari programmers such as Chris Crawford, Bill Wilkinson, Russ Wetmore, Stan Ockers, Jerry White, Tim Oren, Ron Luks, David Plotkin, Ken Harms, Matt Ratcliff, Karl Wiegers, Paul Chabot, Chris Chabris, J.D. Casten, Len Dorfman—and too many others to name them all. But many contributors have simply been regular **Antic** readers with good ideas. If there is any single thing that made the magazine a success, it was the enthusiasm of those readers.



Photography by Lorraine Capparell

The Antic staff: 48 employees at last count, and still growing.

"In a way, the fact that Atari and its audience were always underdogs helped to unify us," Jim says. "Everybody said it was just a game machine. Well, we got sick of hearing that. We all knew the Atari was a great computer in spite of what the press and anyone else said. It's still the case now. There's tremendous loyalty in the Atari market and among our readers."

On the wall of Jim's office are photographs of Robert DeWitt, Les Torok, Marni and Linda Tapscott. If you didn't know these people were the founders of **Antic**, you might think they were family. And in a way, they are a family—now grown to more than 40 employees and some 100,000 readers spanning the world.

DE RE JOYSTICK

PROGRAMMING & REPAIRING THE FIRST USER FRIENDLY COMPUTER INTERFACE

by ADELBERT FERNANDEZ

Everything you ever wanted to know about the classic Atari joystick. How to program it, how to take it apart, how to repair it and where to find one. Also, a BASIC program to control the cursor with your joystick. The program works on all 8-bit Atari computers of any memory size, with disk or cassette. Our title, De Re Joystick, evolved from De Re Atari, *a classic Atari reference manual that's unfortunately no longer in print. It described an array of arcane programming procedures—from Player/Missiles to fine scrolling. The strange title literally means "All About Atari." Keep in mind that certain details differ between joysticks—such as the color of the wires and the layout of the circuit board. The principles, however, remain the same.*—ANTIC ED.

Contrary to the belief of some BASIC programmers, there really is logic to the way the values of joysticks for the Atari are set up. The answer lies in the unusual world of binary numbers.

But first, some foundation. Joystick port 1 is assigned to memory location 632 ($278), which means the status of port one may be found at that location. The full port assignments are as follows:

Port #	Memory	Location
1	632	($278)
2	633	($279)
3	634	($27A)
4	635	($27B)

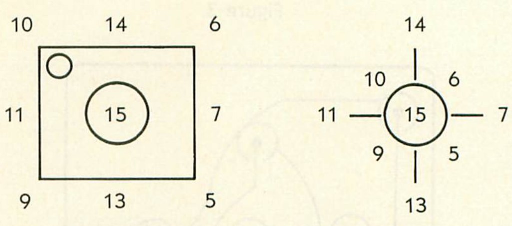
(Ports 3 and 4 apply only to the older 400/800 Atari models.)

To find out the status of a joystick port in Atari BASIC, you use the function STICK(n), where n is the port number. Confusingly, STICK(0) applies to port 1, STICK(1) to port 2, STICK(2) to port 4, and STICK(3) to port 3. Try this:

```
10 PRINT STICK(0):GOTO 10
```

If no one is touching the joystick when you RUN this mini-program, the number 15 should run down the side of the screen. Experimenting with the joystick should give you the results in *Figure 1.* Try changing the line above to STICK(1). You should now be able to read port number two.

Figure 1



But we don't need to use the STICK( ) function. We can go directly to the port location. The above program line can be duplicated like this:

```
10 PRINT PEEK(632):GOTO 10
```

So, why did Atari use such strange numbers as 15, 5, 7, 11? To answer, we must dig deeper and comprehend the joystick works. We'll also need to take a closer look at binary numbers.

But don't panic yet! Stick with us. (Sorry about the pun. It just snuck in.)

JOYSTICK TAKE-APART

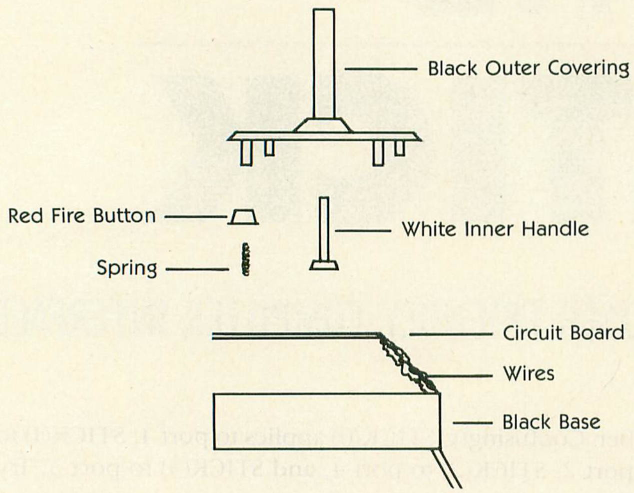
The more adventurous programmers have, at one time or another, taken their joystick apart. That mysterious black box with the protruding stick can save or destroy millions

continued on next page

of beings. (Only in games, of course.)

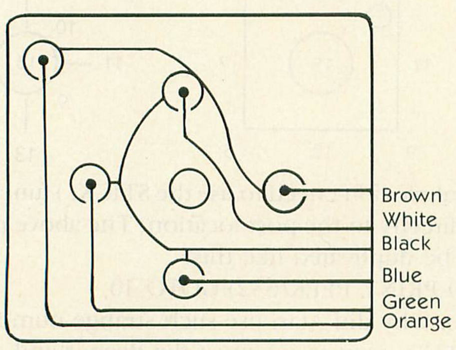
If you haven't stolen a peek inside your joystick, don't get your hopes up. There isn't much to see. They look a little like *Figure 2*. If and when you do remove those four Phillips-head screws on the bottom, be careful not to lose anything—such as that itty-bitty spring that I lost my first time in. I replaced it with a ball-point pen spring. Just cut off about a third and it works pretty well.

Figure 2



The part we are interested in is the circuit board—the square fiberboard with the wires attached. (See *Figure 3*). Notice that the copper lines running across the board eventually end up at the six wires. Five silver buttons accent where the lines meet. Each of these buttons is a switch. When depressed, they complete (close) a circuit.

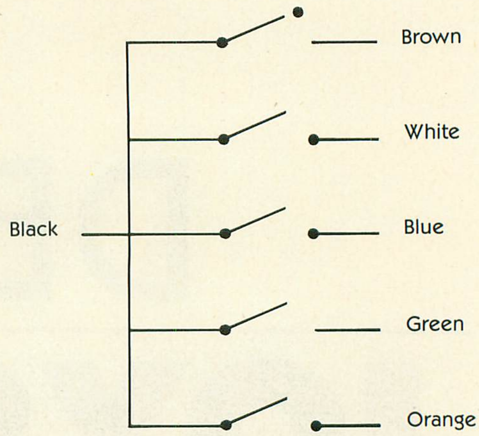
Figure 3



The black wire is ground. The buttons, in turn, are connected to the other wires, one wire per button and each wire containing +5 volts. So, in theory, the joystick is wired as in *Figure 4*.

Each switch in this diagram represents a button, and all the buttons are connected to the black wire. When any switch is pressed (closed), the corresponding port pin is grounded (brought "low"), which causes a zero to show up on that pin. The computer senses the voltage loss and puts the appropriate number in the correct memory location.

Figure 4



This process is the same for each button. The orange wire means the fire button has been pressed. The white wire means the top button, the brown is right, the blue down, and the green left. Therefore, when you push up on the joystick, you are actually pushing the top button down, grounding the white wire. Pushing diagonally up and right results in two buttons being pressed, which will ground both the white and brown wires. The computer, sensing this, will place a decimal 10 in the correct memory location. Fire buttons have their own locations.

BINARY STICK

Okay, here it comes. We have to take a peek at some binary number theory here. But we promise not to go very deep. Every memory location (or address) in your Atari contains one *byte*. Each byte may be a number ranging from 0 to 255, and may be expressed as a decimal, hexadecimal, or binary number. No matter how you and I express it, your computer sees each byte as a binary number.

Binary numbers are expressed solely by means of the digits zero and one. And these digits are called *bits*. There are eight bits in one byte, and each bit represents a value depending upon its position. These values (read from right to left) range from 1 to 128. See below:

128	64	32	16	8	4	2	1	value
0	0	0	0	0	0	0	0	number

The binary byte value 00000001 represents decimal 1. By placing another 1 in the second bit position (remember, reading right to left) and adding the column values in the diagram above, we end up with decimal 3. Binary 00000101 is 5. . .and so on.

Because binary numbers only use two symbols, 0 or 1, these can also be referred to as Off or On. (In computer parlance, when we "set" a bit we turn it On.) Since a computer is nothing more than a complicated series of switches which only understand Off and On, we now see why computers understand binary numbers.

BACK TO JOYSTICK

Now that we've got that out of the way (still there?) we can examine how the Atari reads the joystick. Since, as mentioned, the computer sees everything as On or Off, we can translate this to 1 or 0.

Your Atari sees the joystick as a series of wires, one for each direction, and one for the fire button. If the fire button is *not* being pushed, the computer sees it as "not grounded" and puts a 1 in memory location 644. When the fire button IS pushed, the computer sees it as "grounded" and puts a 0 in 644. And when I say "put", I mean replace. The numbers are replaced when there is a change in condition, not added.

There are four directional wires: Right (brown), Left (green), Down (blue), Up (white)

If none of the buttons are pushed, the computer sees:

1 1 1 1

If the joystick is pushed right:

0 1 1 1

Left:

1 0 1 1

Remember, diagonals are merely two buttons depressed simultaneously. Stick up and left:

1 0 1 0

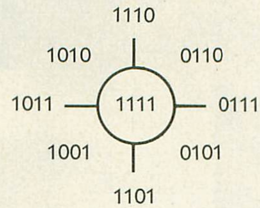
Up and right: 0 1 1 0

Down and left: 1001

Down and right: 0101

Beginning to look familiar?. Take a look at *Figure 5*. As mentioned, joystick port 1 is location 632. Although this location holds a byte (8 bits) only the first four bits are used to read the joystick. The other four are unused. (By the way, these four bits, or half-bytes, are referred to as *nibbles*.)

Figure 5



To sum up, you push your joystick up and to the right, two switches close and ground their corresponding port pins. This places a pair of zeros in the appropriate locations creating the binary number: 0110, which is stored in location 632 as 00000110. When you PEEK at this location, BASIC coverts the binary number to decimal and prints out a six.

Now that you have the knowledge, use your imagination for the applications. You might design a left-handed joystick, or add pizazz to your programs, or make your games more arcade-style. Finally, these ports can be used as real-world sensors.

*Adelbert Fernandez is a high school junior from Princeton, West Virginia. He collects Atari computer equipment and back issues of **Antic**.*

JOYSTICK CURSOR

by TED STOCKWELL

KEYJOY is a short routine that lets you use the joystick to move your onscreen cursor. Or, you can hook up a trackball and pretend you have an upside-down mouse.

Type in Listing 1, KEYJOY.BAS, check it with TYPO II and SAVE a copy before you RUN it. Listing 2 is the assembly language source code for the routine. It is presented for your information and you do *not* need to type it in. KEYJOY is a BASIC program that works on all 8-bit Atari computers of any memory size, with disk or cassette.

To use KEYJOY from BASIC, just RUN the program before you begin working with your main program. The joystick will now move the cursor like the arrow keys do. Normal operations are not affected by this routine and you can include it in any of your BASIC programs.

You may change the cursor speed by POKEing location 0 with any value from 0 to 255. The larger the value is, the slower the cursor will move when the joystick is used.

ODDS AND ENDS

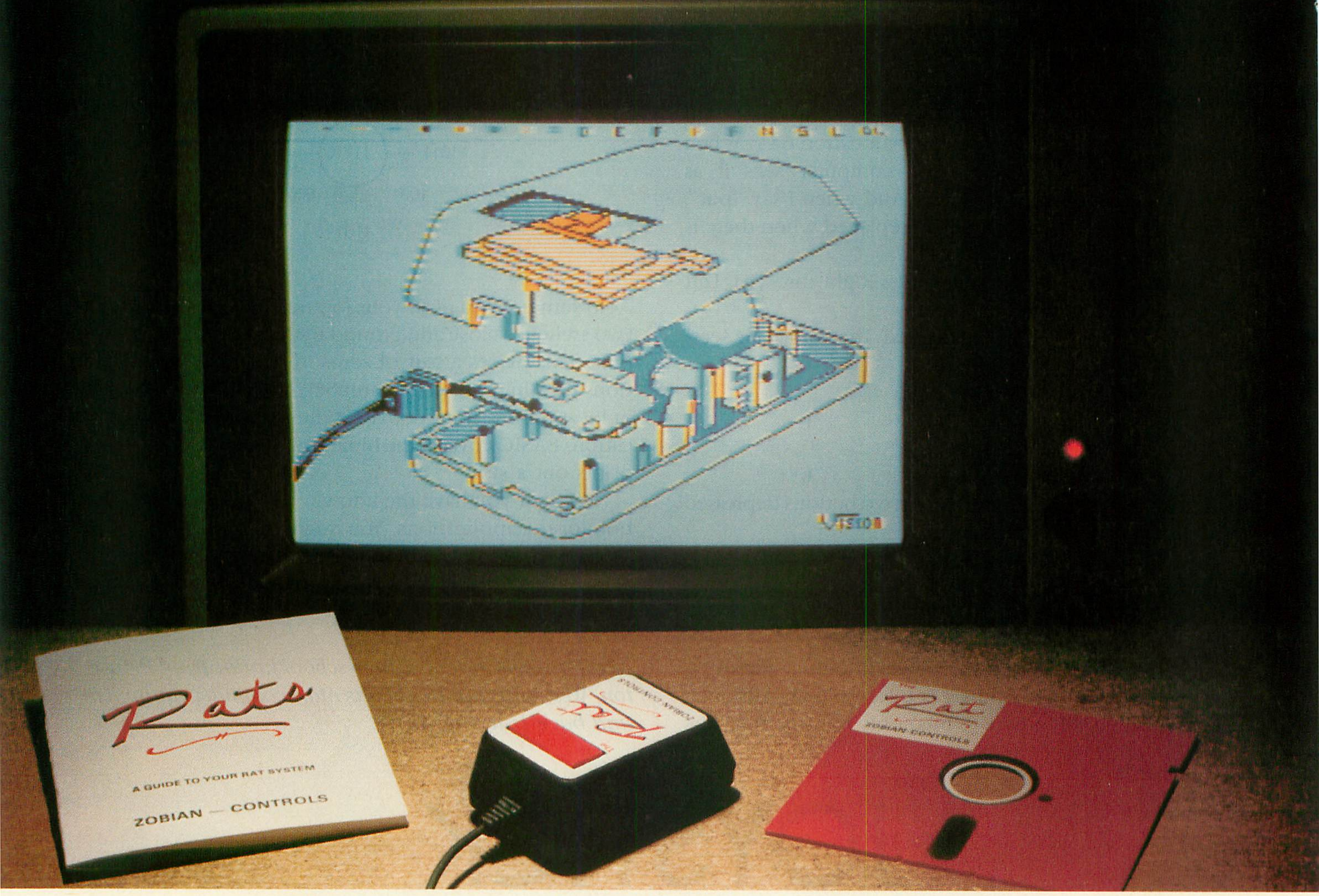
You don't have to understand the program to use it. But knowledge is power. So. . .

An understanding of KEYJOY requires an understanding of assembly language. The routine is designed to be as short as possible, and it has been placed in the lower part of the 6502 stack area. (***Antic** altered the program slightly and placed it in the stack to free Page Six. Don't panic. Through experience, we have found that the stack will rarely grow large enough to endanger this area.—* ANTIC ED)

continued on page 30

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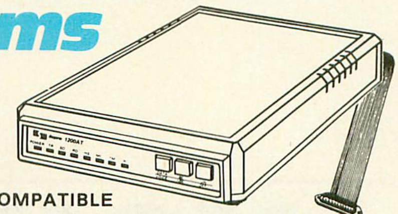


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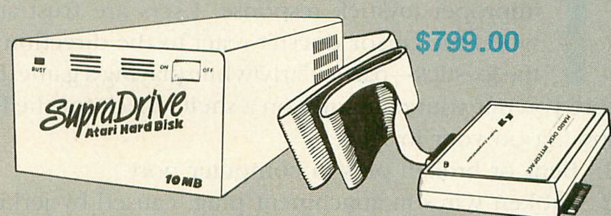
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DE RE JOYSTICK
continued from page 27

KEYJOY has two parts. The first, INSTALL, sets up the Vertical Blank Interrupt (VBI) for MAIN, and only needs to be called once to initialize the interrupt vector. After it has been installed, it will run in the background and can be be ignored. However, pressing the [RESET] key will knock it out.

There is nothing special about why the immediate VBI was used. You may change it to a deferred VBI if you wish. In either case, KEYJOY should remain transparent to your BASIC programs—even if they contain their own VBIs. Of course, if the program is used outside BASIC, the PLA in line 420 of Listing 2 may not be necessary.

Ted Stockwell of Burnsville, Minnesota programs the Atari in assembly language, ACTION! and BASIC.

Listing on page 119

REPAIR YOUR JOYSTICK

by THOMAS SIMMONS

***Antic** received the following for our I/O board, but felt it was unique enough to publish as part of this feature.*—ANTIC ED

Thousands of computers are sitting idle because of improper joystick response. Users are frustrated when the cursor doesn't react to the direction of the joystick—particularly while playing a game. Before you put your computer on a shelf, check for the following on your joystick:

1. Bent or broken pins in computer port.
2. Broken wires in attachment plug, caused by jerking cord out of port.
3. Broken wires in joystick cord.
4. Fractured plastic pressure ring within the joystick. (Simmons Fracture.)

Look at the port pins. Are they nice and straight? Then check the joystick cord wiring with a continuity tester. If the wires are intact, you may have a joystick with the dreaded Simmons Fracture.

Remove the four small screws on the bottom of the joystick and take it apart. Oops! keep an eye on that spring. Now, examine the white plastic ring at the base of your stick. It should look like *Figure 6*.

Don't put tape around the fracture or try to glue it back. This won't work. Let me show you a better way.

Get a plastic cola bottle. Cut a piece from it and punch a hole in it with a paper-punch. Now, wrap the plastic around the fractured piece and tape the out-flaps, as shown in *Figure 7*.

The plastic pressure ring is easily broken or fractured if the joystick gets too much pressure over a period of time. Treat it gently and get those computers operating!

Thomas Simmons, discoverer of the Simmons joystick fracture, is from Sarasota, Florida.

Figure 6

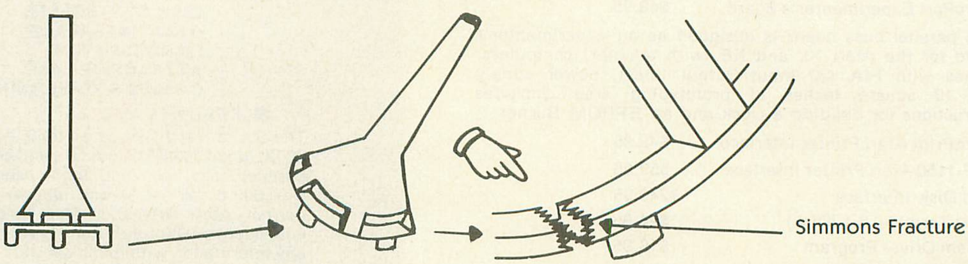
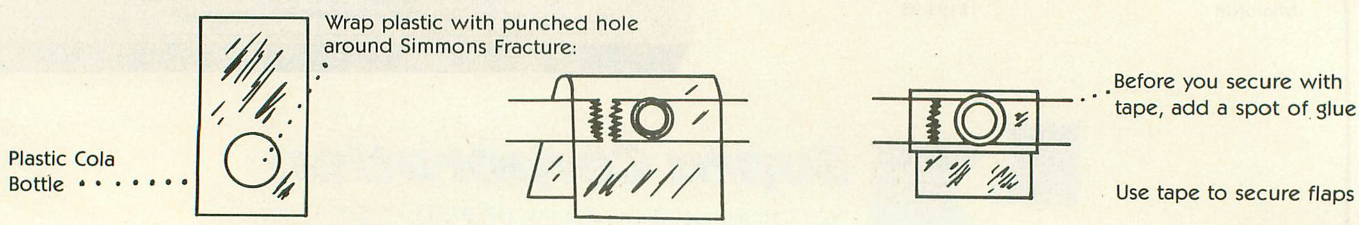


Figure 7



FOR SALE:
ATARI JOYSTICKS

by GIGI BISSON, **Antic** Assistant Editor

The genuine, original, official Atari CX40 may be the only joystick that you wouldn't be embarassed to have sitting on top of your desk. Its minimalistic all-black plastic design is elegantly functional—that short, slim, flexible stick mounted in a compact base adorned only by a single red button. No suction cups, no massive gear-shifter shaft, no weighted 10-pound base—not even an Atari logo or model number. Sigmund Freud would not be able to have a field day with this joystick.

But talk to any veteran gamer about the "real" Atari joystick and you'll hear genuine admiration. "It's easy to use, easy to handle—people discovered that those big clunky joysticks are not really that great," says a sales rep for American TV, an Atari mail-order retailer. Sturdy too. An **Antic** writer told us the story of a friend who lost his official Atari joystick. He found it, with cord cut off, in the backyard. His mother was ramming it into the ground, stick first. The Atari joystick apparently makes holes just deep and wide enough for planting vegetables seeds in the garden.

During the peak of the video game craze, this joystick was in one out of seven American homes. Today, it's hard to find and many dealers have exhausted their supplies. Some dealers say they can only obtain them by ordering two controllers packaged with Pac Man and Qix cartridges for $19.95 in an Atari "Entertainer," "Arcade Champ," or "Recreational Computer" kit.

However, the following dealers still have the CX40 in stock. But check **Antic** ads first. Some mail-order retailers may require $20 minimum purchases or shipping charges that exceed the cost of the joystick itself.

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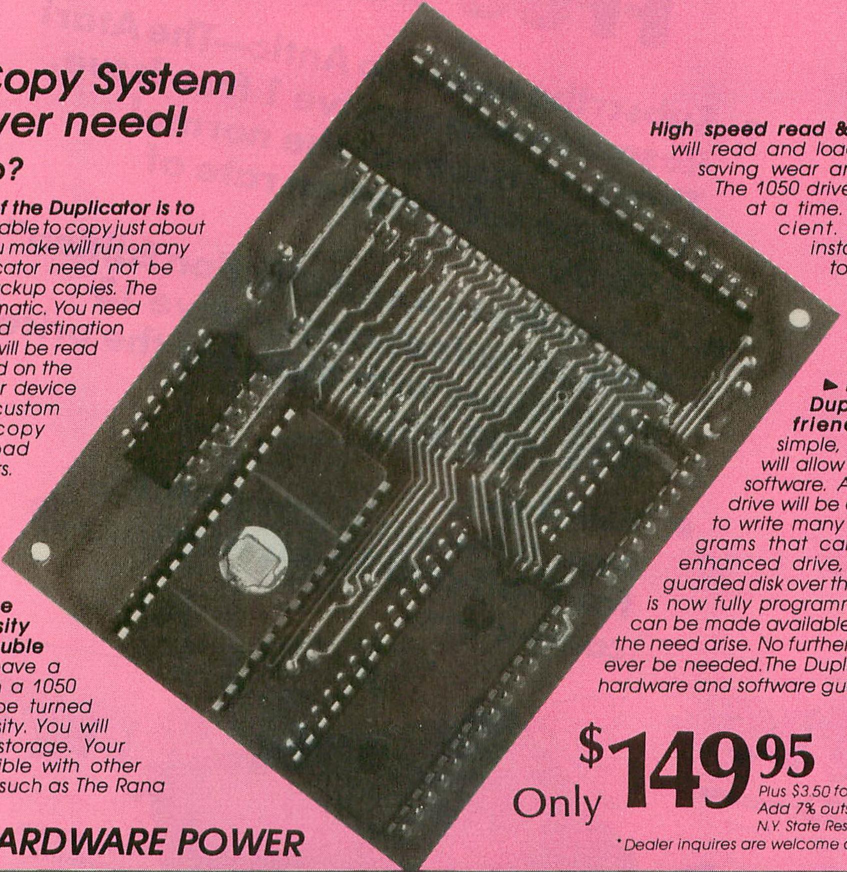
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GRAPHICS DUMP FOR NON-GRAPHICS PRINTERS

by MICHAEL KRUEGER

If you have a so-called "non-graphics" printer, this is the program for you. Poster Maker creates huge, poster-sized ASCII printouts from any picture in Micro Illustrator format. And it will work with almost any printer—including letter-quality daisy wheel printers! This BASIC program will run on any Atari 8-bit Atari computer with 32K and a disk drive.

If you own an "impact" (daisy wheel) printer, you probably enjoy professional looking, letter-quality printouts. But you also may have wanted—just once or twice—to be able to do a screen dump, like those dot-matrix printers.

And there are probably a few readers out there with dot-matrix printers incapable of handling graphics—such as the Atari 1027 or the Epson HomeWriter.

Surely, all of you are aware that none of these printers are capable of graphics. Obviously none could print a 160×192 pixel four-color Micro Illustrator screen, right? Wrong. With Poster Maker, it is possible to print any screen drawn with Micro Illustrator on most non-graphic printers.

If you can think back as far as the late '50s or early '60s you may recall "typewriter" pictures of subjects like Abraham Lincoln, meticulously made up of X's and O's on someone's typewriter.

Poster Maker does the same thing, only the computer does all the hard work. The program converts screen pixel values to ASCII characters. Of course, these screen dumps are not quite the same as graphics dumps.

For one thing, Poster Maker creates BIG pictures. Depending on your printer, your final picture may measure over 2 feet wide and 1 1/2 feet high. Also, since the picture is made up of ASCII characters, you might want to stand back a bit so that you can identify the subject matter.

If you're wondering how a two-foot poster can come out of a printer with an 8 1/2 inch carriage, the answer is simple: You're going to have to do a little cutting and pasting.

But don't let that scare you. The result is well worth the effort.

TYPING POSTER MAKER

Begin by typing in Listing 1, POSTRMKR.BAS. Of course, check it with TYPO II and SAVE a copy before you RUN it. If you don't wish to type the machine language strings in lines 310 and 470-530, simply leave those lines out. SAVE the incomplete program, type NEW—then type and SAVE Listing 2.

When you RUN Listing 2, POSTR2. BAS, it will create a disk file called STRINGS.LST containing the special lines. To merge these lines with the incomplete program, LOAD Listing 1 and type ENTER "D:STRINGS.LST" [RETURN]. Be sure to SAVE the completed program before you RUN it.

RUNNING POSTER MAKER

Poster Maker can only print picture files created with Micro Illustrator-style software, such as the software supplied with Atari Touch Tablet and Light Pen, KoalaPad, Tech-Sketch, Chalk Board. etc. If you have other graphics software, see Charles Jackson's *Rapid Graphics Converter* in **Antic**, November 1985.

When you RUN Poster Maker, you will see a directory of all files on disk drive 1 with ".PIC" extenders. So make sure your picture files contain this extender.

You will need nine or ten sheets of tractor feed paper. It doesn't matter if your printer accepts tractor feed, as long as all nine sheets are attached and can run through your printer without skewing out of line. Poster Maker will not wait for each sheet.

Line up the edge of the paper, turn the printer on, and type the name of the file you wish to print. (Don't type in the "D:" or the ".PIC" extender.) Brief instructions will appear on the screen. Press any key to load the picture file from the disk.

You will now see the picture on the screen. The background will be white, and three other colors will be shades of gray. If your picture looks fine now, press [*] to begin printing.

If you don't like the shades, you can alter them. Press [1] to alter the shade of Color 1, [2] for Color 2, [3] for Color 3, or [0] for the background. When the shades are set to your liking, press [*].

The screen will blank and the printing should begin. You may want to turn off the monitor and disk drive and relax. The printing will take a while. If the printer runs out of paper or is switched off, the program will start over.

CUT AND PASTE

When the printing is complete, remove the strip of paper and take a look at the printout. You should see three long groups of printed characters. Each group—or section—will be approximately three pages in length.

The first section printed by Poster Maker, when viewed horizontally, will correspond with the bottom third of your screen picture. The next section is the middle, and the third section is the top.

Okay, get out your scissors and tape and go to it. (***Antic** takes no responsibility for those programmers unable to put together a three-piece jigsaw puzzle. Please, do not call or write.*—ANTIC ED)

SUBROUTINES

I borrowed the subroutine that loads Micro Illustrator files from the **Antic** *Rapid Graphics Converter* program mentioned above.

I modified the original routine only slightly. In my version the data is printed to the screen instead of being stored in a string. This subroutine (lines 420-560) can easily be used in your own programs. Your program must first DIM MAIN$(342) and FN$(16), then place the name of your picture file in FN$.

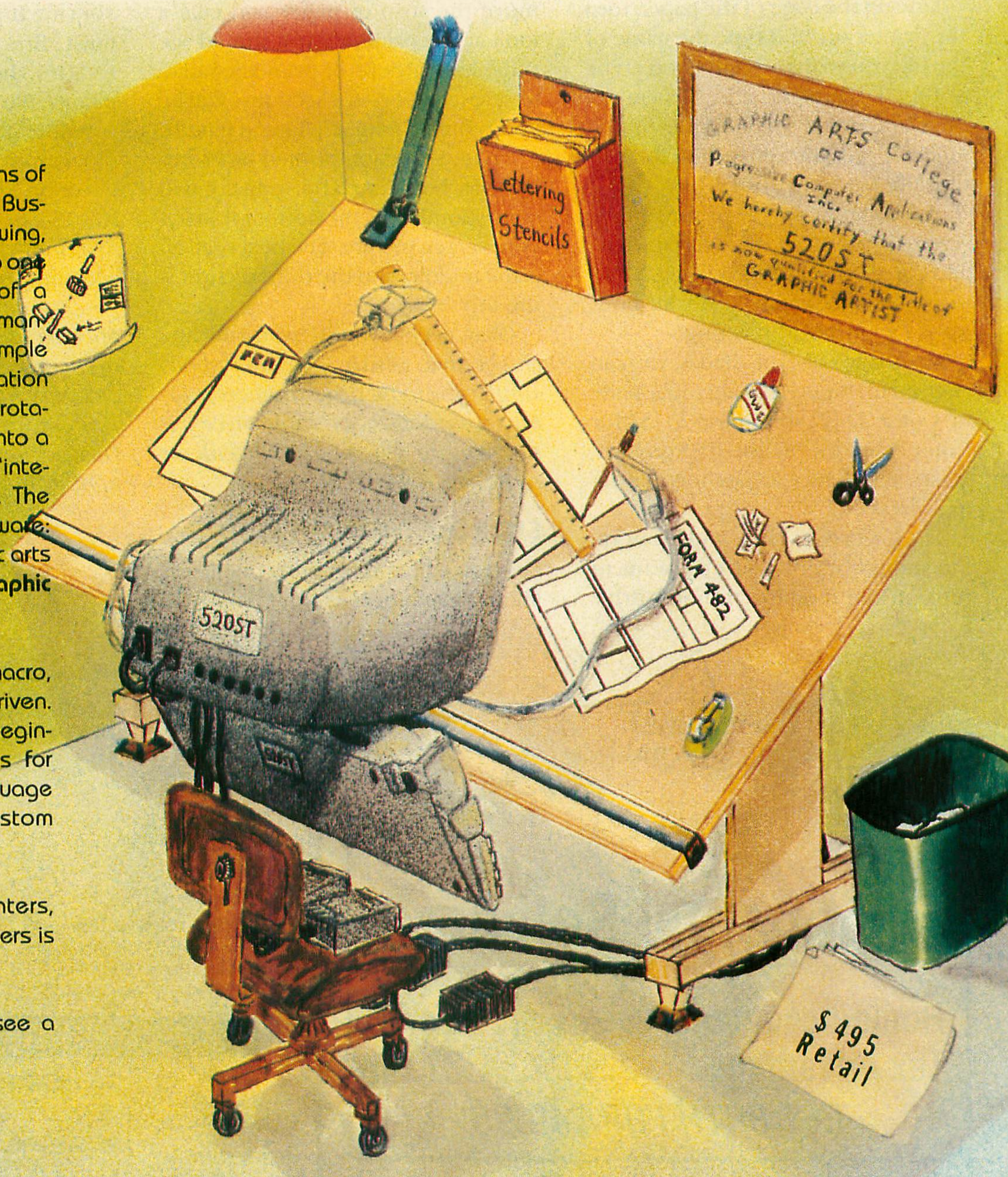
Before calling the routine, your program must also be in ANTIC mode E—or on XE/XL computers, GRAPHICS 15+16. For the sake of 400/800 Atari models, we've added line 310 to accomplish this.

Michael Krueger, 16, is a high school sophomore from Vermillion, South Dakota. He debuted in the March, 1986 **Antic** *with* Build Your Own Lie Detector *and seems to be some sort of Atari hardware adaptation whiz.*

Listing on page 118

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DIGITAL GARDENER

DATABASE FOR BACKYARD VEGETABLE GROWERS

by CHARLES BARTISH

Digital Gardener plans the layout of your vegetable garden and maintains a record of your plantings from year to year.—but you'll still have to plant it yourself. Just enter the size of your parcel of land and choose your vegetables (among 30 given varieties from asparagus to watermelon). Digital Gardener tells you how many plants per vegetable row to plant, and how far apart your rows will need to be. You can SAVE your plan for use next year, and print out a report to carry to the backyard. This BASIC program works on 8-bit Atari computers with 32K memory and disk drive.

Every spring a young man's fancy turns to baseball, love and—gardening! But gardening is no hasty pleasure sport. You need to plan before the earth is turned and seed is sown. Do you like radishes? Plant as many as you'd like. Hate spinach? Leave it out. With Digital Gardener, you simply tell the computer which vegetables you want to plant and the size of your plot of land. Your Atari will determine row spacings and planting distances, tell you which vegetables are most compatible when planted next to each other, and draw a colored map of your garden with all the rows labeled. You can then store your garden layouts on disk to review and modify next year.

With this type-in listing and your 8-bit Atari computer with disk drive, this spring you'll avoid the inevitable frustration that sets in when you remember that you've been through it all before, but you can't find the scrap of paper that recorded the plan for last year's delicious harvest.

YOUR PLANTING PLAN

Type in Listing 1, MYGARDEN.BAS, check it with TYPO II and SAVE a copy before you RUN it. From the main menu, simply follow the prompts.

First, decide whether you are preparing a new garden or recalling an old one for review. The program stores completed gardens with the file extender .GAR and shows you the stored list if you select the RECALL option. (Antic Disk subscribers will find two sample gardens listed under JOES1984.GAR and DADS1984.GAR).

To plan a new garden choose the MAKE option. Give the garden a name and type in the desired number of feet for length and width. The program will recommend a length, but you need to specify the width, or just go ahead with the suggested garden size of 15×30 feet.

Lines 4000-4290 store the data for each of the 30 vegetables in the list. This data provides the name, row spacing, plant spacing, number of plants to feed a typical family of four, and height requirement for each vegetable. (This information came from *Grow Your Own Vegetables* by Robert Fletcher, Reference Circular 559 from Pennsylvania State University Publications, 1974).

The program places the tallest plants closest to the north border. (You may want to adjust the location of your plot according to the sunlight exposure so that lower vegetables, such as lettuce, are not shaded by the corn). Plants are ranked by height—tall pole beans and corn are assigned

continued on next page

height values of 1 and 2, respectively. Low-growing radishes get a height value of 28. You may set up combinations of vegetables if you know you will use space in the same row for different members of the same family. For example, my CB1 (combination one) is a mixed row of Brussels sprouts, broccoli, and cauliflower.

The program will recommend the number of rows or plants you should grow to satisfy the needs of a typical family of four. You can change these values anytime you run the program, or you can insert new values in the DATA statements to suit your own personal needs.

PLOTTING THE PLOT

Now that you've selected the key garden parameters, store the data to disk. The program will add the suffix .GAR to your garden data file name. Pressing [START] will allow the program to calculate the arrangement, row spacing and plant spacing for the garden.

Onscreen you'll find each vegetable's name and the following information: DISP is the distance between plants in inches. ROWS is the number of rows of that particular vegetable. DISR is the distance between rows in inches. And SUM is the distance, in feet, of the last row of a given vegetable from the north end of the garden.

The first row of the first vegetable is always planted six inches inside the border. Digital Gardener will calculate the length required for the garden. If the recommended length exceeds the specified length by more than 10%, a warning message and options for proceeding will appear. One option, of course, is to accept the recommended new length and break out the rototiller, fertilizer and mulch and get started!

When you and your Atari are satisfied with the plot, press [START] for a colored drawing of the garden. Each group of rows will be identified by the first three initials of the vegetable's name, and the number of rows of each vegetable will appear. Press [START] again to return to the Garden Summary. To get a printout of this summary, press [SELECT].

PLOTTING YOUR OWN

The resolution of Graphics 7, used for showing the garden plot, limits the number of rows on the screen to about 70. However, the program will calculate much larger gardens. The variable ROWGAR is dimensioned for 70 rows and must be increased to accommodate larger gardens. You don't like traditional rectangular garden plots? Create your own complex garden designs with this program by breaking the larger garden graphically into smaller ones.

Charles Bartish, PhD, is a chemical research manager in Allentown, Pennsylvania. He uses Digital Gardener himself to successfully plot vegetable gardens from a 3×5 foot postage stamp, to a monster 25×50 foot family plot that yielded an enormous crop.

Listing on page 120

MOLECULAR WEIGHT CALCULATOR

CHEMISTS' ANTI DRUDGERY TOOL

by JIM PIERSON-PERRY

Chemistry students exult! MW-CALC will calculate the molecular weight of virtually any chemical formula. This BASIC program works on all Atari 8-bit computers of any memory size, with disk or cassette.

Anyone taking a chemistry class quickly finds out that determining the molecular weight of a chemical formula is a repetitive and boring task. In addition, it seems as if all calculations in chemistry are based on molecular weight. I have faithfully done this for years, but no longer! Now my Atari computer has taken over this chore with MW-CALC.

This program accepts a chemical formula as input, checks it for errors and then displays the molecular weight and an elemental composition table (percentage of each element in the total molecular weight). Note that chemical element symbols use both upper and lower case letters, so be sure that the lower case keys are toggled on, or you will be flagged for errors.

My previous BASIC programming approach had been to quickly hammer out code and hope that any needed corrections could be done later by patching. This worked, but it yielded a messy program which was difficult to follow during the debugging phase.

With MW-CALC, I changed to a structured programming approach—plan the overall task, break it into smaller tasks, code the small pieces and logically assemble them following the overall plan. I found that this method greatly speeded up my software writing. And by having an organized program structure, debugging time was a bare minimum (an ounce of prevention . . .).

BACKGROUND BUZZWORDS

To use MW-CALC and understand its structure, you need some simple knowledge of a few chemistry terms. (Chemistry students go directly to USING THE PROGRAM and do not collect $200).

All substances are made up of combinations of "building blocks" called elements. For example, table salt is made up of the elements sodium (Na) and chlorine (Cl). Each elements has its own atomic weight. When elements join together to make a substance, the result is called a molecule (such as NaCl—salt) and its molecular weight is the sum of all the atomic weights of the elements in it.

To complicate things, sometimes small groups of elements combine to make a unit called a radical which acts just as if it were an element. An example is NH_4 which is part of the molecule $(NH_4)_2SO_4$ (ammonium sulfate, a fertilizer).

Radicals are enclosed within parentheses and may have a subscript like a regular element. Nested radicals are not allowed. Finally, a molecule may have some number of a smaller molcule associated with it. This is called (at least by me) a hydration complex. An example of this is $Na_2B_4O_7 * 9H_2O$ (borax). Only one hydration complex (if any) can be in a formula.

Another useful piece of information about a molecule is its elemental composition. This is a table showing what percentage of the total molecular weight comes from each element

in the molecular formula. For this calculation, all occurrences of an element within the formula are lumped together.

In the borax formula above there are 16 occurrences of the element oxygen (O), seven in the main molecule and nine in the hydration complex.

USING THE PROGRAM

MW-CALC is a BASIC program that will accept a chemical formula and display its molecular weight and elemental composition. It is error trapped to prevent use of invalid element symbols or expressions and will flag them in the input string (if present) for easy correction.

The input formula is limited to no more than 39 characters and no more than 12 different elements. This should not be a problem, since the largest formula I know of is only 23 characters long and the largest number of elements in a formula that I could find was eight. If more elements are present, the molecular weight will be calculated but the elemental composition will not be displayed (to prevent messing up the display screen).

Type in Listing 1, MWCALC.BAS. Check it with TYPO II and SAVE a copy before you RUN it.

When you RUN the program, it will first display an introductory screen, then take a few seconds to initialize variables and arrays. An input screen will then appear and wait for you to type in the chemical formula.

Again, be sure to use correct upper/lower case letters for the element symbols or you will be flagged for invalid elements. If any errors are detected, the buzzer will sound and an error message will be printed along with arrows pointing to the offending character(s). Press any key to re-enter the corrected formula.

After a few seconds, the display screen will appear with the results and an option to enter another formula. Answering "No" to the option will terminate the program.

PROGRAM TAKE-APART

Here is an overview of the program structure. I put the often used subroutines at the front of the code to speed up execution time.

2900-3900	Subroutine to get subscripts.
4200-5200	Subroutine to get element symbol and test for validity.
5600-6000	Subroutine to signal start of radical.
6500-7300	Subroutine to signal end of radical.
7800-8400	Subroutine to signal start of hydration complex.
8700-9900	Start of main program/initialization.
10000-11700	Formula input.
11900-15000	Main loop to evaluate formula and build element composition table.
15600-16900	Complete element composition table and merge redundant element entries.
17100-19200	Display results.
19800-21000	Error handling routine.
21400-22100	Element atomic weight data.

After initialization, the program displays the input prompt screen and waits for the string input (F$). The string is tested to be sure it is not null or exceeds 39 characters, then the main evaluation loop begins.

A pointer (P1) is set to the first character in the string. Only the following characters are allowed:

(or [	Start of a radical
) or]	End of a radical
* or .	Start of a hydration complex
Capital letter	Start of an element symbol

If the character is a capital letter, the next character is also tested to see if it is a lower case letter. (If not, the second character is assumed to be a null.) Chemical symbols are either a capital letter, or a capital followed by a lower case letter.

This test symbol (E$) is then compared with an array of valid element symbols (SYM$) and gives an index number (ATNUM) into the atomic weights array (WT). The pointer is moved to the next character after the test symbol and a subscript is obtained (if present, else default value=1).

The atomic weight is then multiplied by the subscript and added into the running molecular weight sum (MW). The main loop is then continued until the pointer exceeds the formula string length.

If a radical is detected, a flag (RFLAG) is set and the elements within the radical are added into a temporary radical sum (RTEMP). At the end of the radical a subscript (RSUB) is obtained, the flag is reset and the radical weight is multiplied by the subscript and added to the overall molecular weight. A hydration complex is handled like a radical except that the subscript comes first.

While debugging, I ran into the Atari BASIC bug of computing a negative zero value (A=0:PRINT -A). Although this bug has been documented elsewhere (e.g. *The Atari BASIC Source Book*), it was my first encounter with it. The problem came in line 13900 and I got around it by using the equivalent expression 0-A instead of -A. The bug does not occur with BASIC XL.

Jim Pierson-Perry is a research chemist with DuPont. Although Jim has programmed a variety of computers over a 10-year period, he became an Atari evangelist when his daughter's school began using them in 1982.

Listing on page 137



Another Great Simulation from Sid Meier – Author of F-15 Strike Eagle

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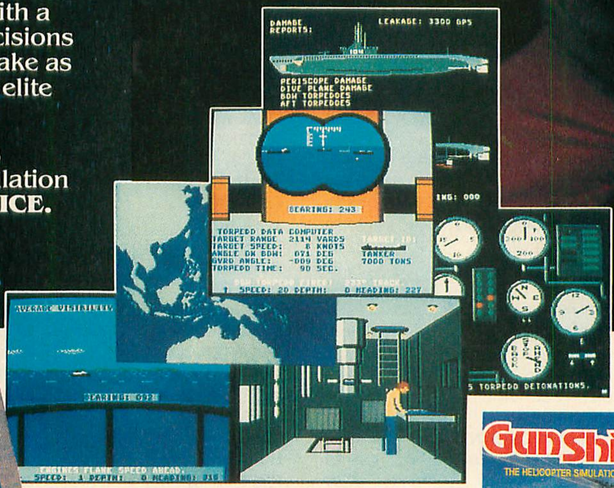
SILENT SERVICE

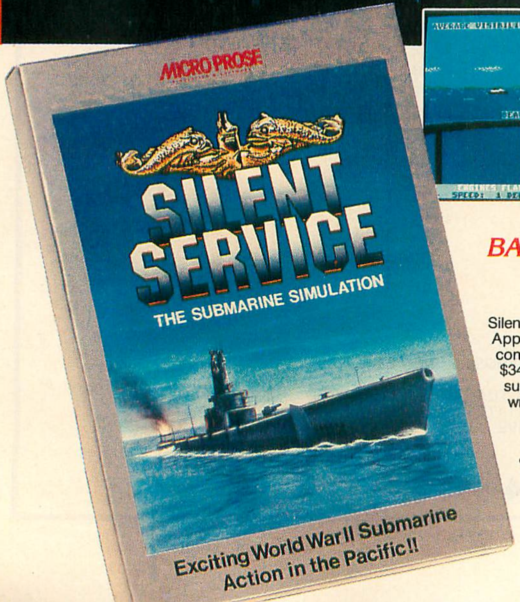


Thrill to the initial sighting of the enemy's strike force in your periscope as their ships come into your range. But watch out — the enemy's escorts have just sighted you. You're the **hunter** — but suddenly — you've become the **hunted!**

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It's **exciting** — and it's **fun.** It's another great Micro Prose simulation — and it's called **SILENT SERVICE.** Look for it now on your dealer's shelves.





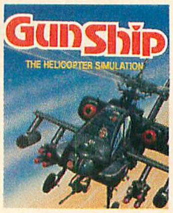
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Photo courtesy Baltimore Maritime Museum

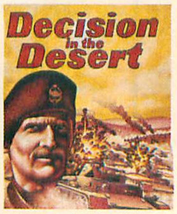
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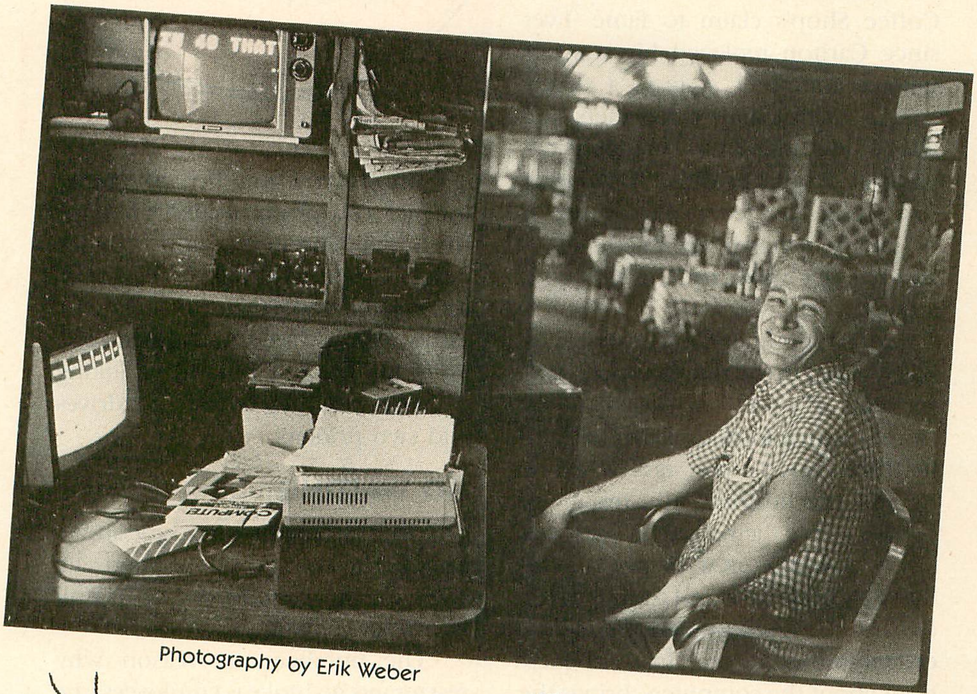
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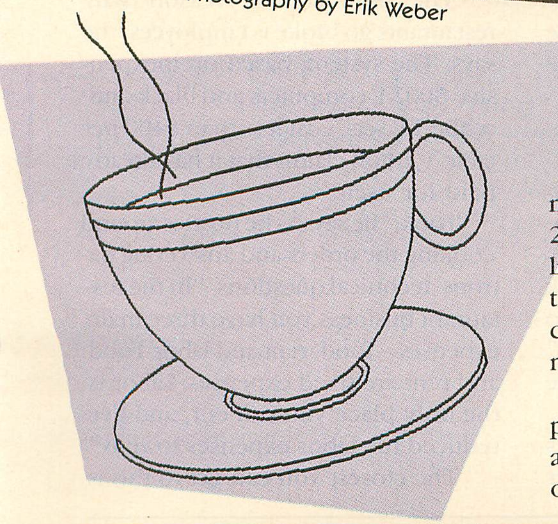
by GIGI BISSON, **Antic** Assistant Editor

ATARI CAFE

WORLD'S FIRST COMPUTERIZED COFFEE SHOP



Photography by Erik Weber



It's the last place you'd expect to find innovative technology. Cedar Ridge, California, pop. 201, high in the former gold-mining country of the Sierra foothills, 200 miles from the smog and neon lights of San Francisco, seven miles off the main highway leading to the casinos of Reno, Nevada. Out in the middle of nowhere.

Route 174 is a narrow strip of asphalt that twists past cow pastures and winter-bare branches of almond orchards in the rolling foothills of the Sierra mountains. It veers sharply to the right, taking you on a winding tour of the business district of Cedar Ridge. Like most towns in the Mother Lode, the elevation far exceeds the population.

The sign on the roof of the Roundup Coffee Shop is bound to attract passers-by. (And why not, it's the only coffee shop in town.)

Free coffee every day
Free movies every night
Free video games for the kids

But this isn't "Chuck E. Cheese's Pizza Time Theater Goes to the Woods." The entrance beckons with a poster of a menacing skull and cross-bones done in that unmistakably folksy mechanical dot-matrix style of Broderbund's Print Shop software:

"Warning: During closed hours the computers call police if building entered. Armed owner on premises." The skull is surrounded by a border of computer-generated hearts.

Never mind the boarded-up gas pumps outside, the wall clock shaped like a stagecoach, quaint red-and-white checked tablecloths and cur-



tains. The Roundup Coffee Shop is the roadside restaurant of the future.

Owner Monty Carlton doesn't miss his waitress. "These are the first waitresses that I've ever had that write orders I can always read. I got tired of squinting at the hieroglyphics." He now has a crew of 13 black-and-white mechanical servants who cast a dull purple glow over the dining room of his cafe. They never get sick, they don't talk back to the customers, they'll never ask for a raise, and best of all—they can add and subtract without making mistakes. They're Atari computers.

NO TIPPING

The lunchtime rush is eerily silent, punctured by an occasional explosion, the gobbling noises of "Pac Man," or the whine of the dot-matrix printer. Outside, the sun is shining on gnarled oak trees against the bluest of blue skies. But inside it's curiously gloomy—the lights must stay dim to keep the glare off the wall-mounted television sets. The knotty pine ceiling is a spiderweb of wires, the floor a maze of power strips. Joysticks dangle from the ceiling on black wires. A banner scrolls by on the television screens: "No tipping the computer. If it has money, it may quit."

The tabletops are a still life that could be entitled: "What's wrong with this picture?" Ketchup, mustard, chrome-plated napkin dispenser. Salt and pepper shakers. . . joystick. Computerized messages flash by. "Today's Special: Homemade Chili." "Your Ad Could Appear Here for $8 a month."

It may be the last place in America where you can buy a steak dinner for $3.95. But that's not the Roundup Coffee Shop's claim to fame. Ever since Carlton replaced his waitress with a computer system, a steady stream of newspaper reporters and television cameras have made the pilgramage to what he calls "The world's first computerized coffee shop. It definitely brings in the customers—and the free publicity," he says with a laugh.

An Atari computer enthusiast who has worked in the restaurant business for most of his life, Carlton escaped from Los Angeles and moved his family to this town a year ago. When he bought the business, the restaurant had a western theme and business was slow. Now, the crew of Ataris saves him $20,000 a year and Carlton is the only human employee. He fries up the orders in the kitchen, answers questions about the computers, brings the food to the customers and buses the tables.

BBS BURGERS

Monty's computer-printed menu features food from the heart of America. There's the "BASIC Special" (Homemade Biscuits and Gravy), the "Disk Drive" (Four Griddle Cakes and two eggs for $2.25) "Lap Top Portables" (Beverages) and "Bits and Bytes" (side orders).

The coffee shop seats 52 customers, with a joystick and an Atari computer at each of the 13 tables. Blocky, computer-generated banners advertising "Home-Made French Fries" and "Country Biscuits and Gravy" span the knotty-pine paneled walls. The accounting for the business is done with his own software on the Atari. Even the security for a restaurant full of tempting electronic equipment is taken care of by Ataris hooked up to an alarm system.



Carlton even claims he's discovered the first truly practical application for the Supra Micronet, a local network designed primarily for schools that allows eight computers to share the same disk drive and printer. The Roundup has two Micronets linking 13 Atari computers to two disk drives and two printers.

NO WAITING

This isn't just another roadside attraction. Carlton talks about his Atari cafe with all the seriousness of a Wall Street accountant.

"The number one reason why restaurants go broke is employees," he says. The system, based on inexpensive 800XL computers and black-and-white TV sets, cost less than $400 per table. Carlton claims that it has already paid for itself.

"Look," he says as he bustles around cooking the orders and answering patrons' technical questions, "In the restaurant business you have three main expenses—food, rent and labor. Food and rent are fixed expenses. Labor is the only place you can cut, and I've reduced my labor expenses to zero."

"The closest you can get to this is

the automated teller machines at banks," Carlton says. "Once people got used to using ATMs, they got impatient with waiting for real tellers." He's taken the "wait" out of "waitress." "If a customer comes in and knows what they want, they can order from the computer and get the order to the cook immediately," he says. "How many waitresses ask you how you want the bacon cooked? It's always burned or cold. The computer can ask you questions and give you answers a waitress would never think of."

And the service is fast. It took less than three minutes for Carlton to fry up the specialty of the house—a BBS (Bulletin Board System) Burger—and deliver it to the table.

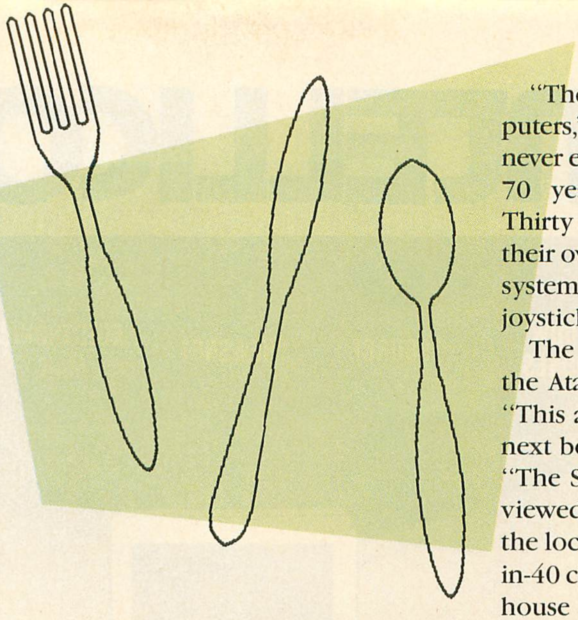
As a deterrent to non-computer orders, a message flashes onscreen, "Order from the computer and have one chance in 40 that the computer may buy your lunch." Another banner flips by: "Today's special: Fresh Apple Pie. Chili and Beans." Press the joystick trigger and the menu appears on your tableside TV. Carlton wrote software that leads the customers through CompuServe-style displays where they make choices by pulling back on the joystick.

When an order is completed, they enter it by pressing the joystick trigger. The check is tabulated and printed out in the kitchen as the obnoxious screech of the printer drifts into the dining room. While waiting for Monty to fry up lunch, customers can pop in an Atari game cartridge and play Pac Man or Pole Position.

'THIS IS WEIRD"

A family of four walks in off the road. They crane their necks and gawk at the black-and-white TV sets and the computer-generated banners. The kids tug Dad's shirt tails and say with wide eyes, "Daddy, this place is weird!" But as soon as the kids discover the joysticks and the free computer games, they love it. Mom struggles to figure out how to use the menu while Dad asks Monty, "Don't you end up doing *more* work this way?"

"No, you just have to train the neophytes," Carlton says, "If we all took to computers like the kids, this would be easy."



The Roundup isn't the first technological encroachment in the Sierra foothills. Ironically, it's on the main route leading to the town of Grass Valley where, during the glory days of videogames, Atari, Inc. had their own Camp David. At this think tank retreat started by Nolan Bushnell, several Atari innovations including the X-Y monitor and the VCS game machine were born.

SILICON FOOTHILLS

You would think that the locals of this county of sawmills and orchards would be bitter about computers replacing a job opportunitity. But Carlton says it's not an issue.

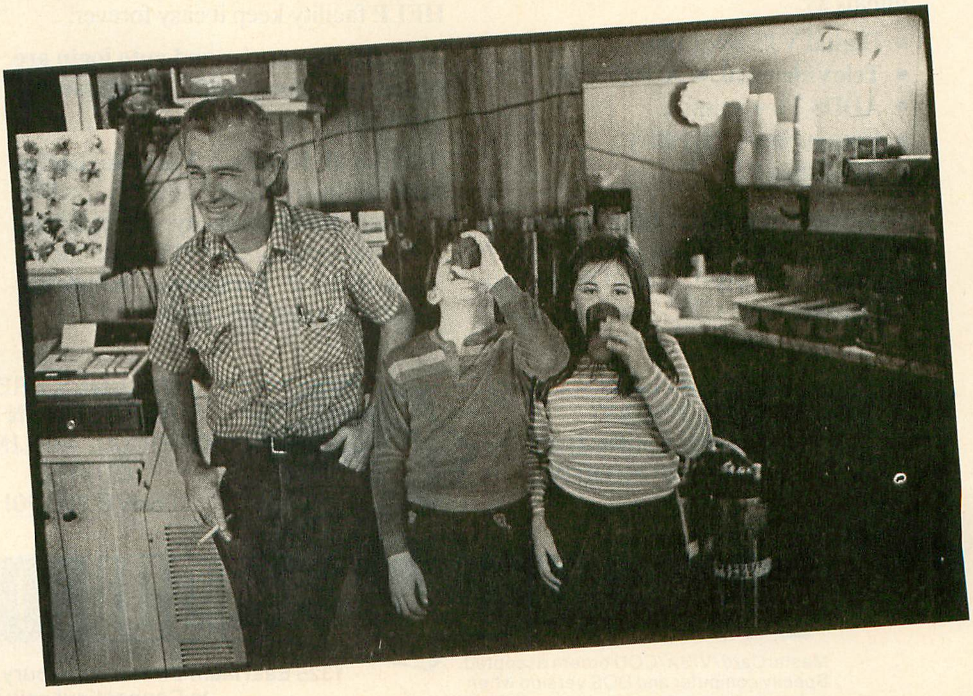
"The customers love the computers," he says, "People who would never even touch 'em—little old ladies 70 years old—they're delighted." Thirty regular customers already have their own private menus built into the system, recallable with a push of a joystick trigger.

The locals like the excitement that the Atari Cafe has brought to town. "This ain't a town," a woman in the next booth corrects me, "It's a dot." "The Sacramento TV cameras interviewed me last week," she says. But the local residents seem to like the 1-in-40 chance of winning lunch on the house more than the TV cameras, Atari computers and free video games.

"We came in a little low on cash one day, and we ordered the cheapest thing on the menu—and, darnit, we won," she says. "The odds are better than the California Lottery. We call it eating to win."

The veins of gold have long since dried up. But for hometown entrepreneurs like Carlton, one frontier remains—computer technology. He plans to package Atari computers along with his software and market it as a dedicated restaurant system.

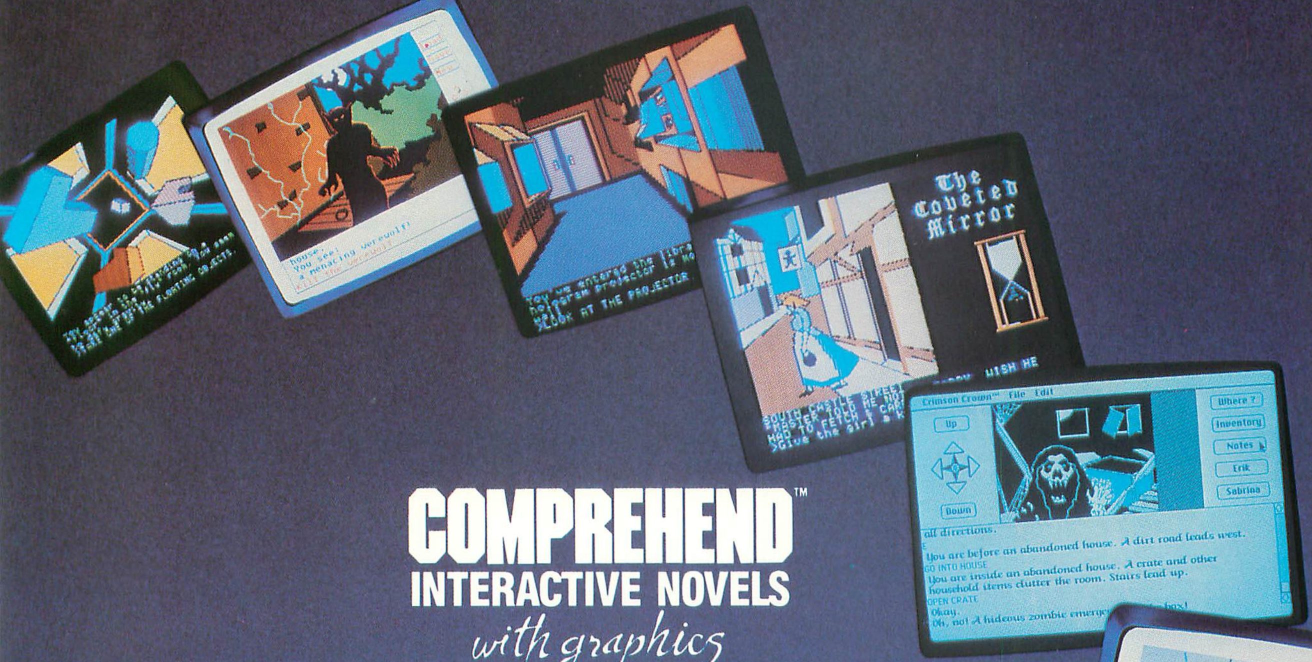
"If you installed this system in a Denny's or a Bob's Big Boy, think of the money you'd save. You're talking hundreds of thousands of dollars a year," he says.



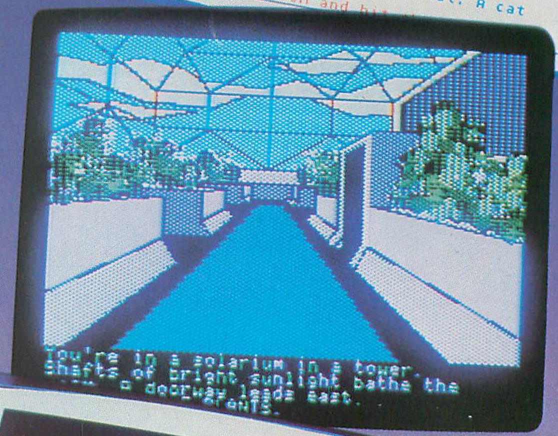
THE ST RESOURCE

ANTIC · MAY 1986 · Vol. 1, No. 10









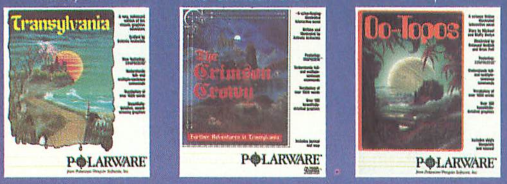


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VOLUME 1 NUMBER 10

JOYSTICK ST

Program those DB-9 ports

By Patrick Bass, **Antic** ST Program Editor

Let's face it. Some programs work better with joysticks than with the keyboard or a mouse. People are comfortable with a joystick now. Some children have even grown up from infancy with a joystick in one hand. The Atari 520ST can access joysticks also, and this article will familiarize you with the methods needed to initialize and get readings from the joystick ports from C language. (Right at the start, we should tell you that we have not yet discovered how to do this from ST BASIC or LOGO.)

PHYSICAL REALITIES

The Atari 520ST has two DB-9 joystick connectors located on the right side of the cabinet, towards the rear: Joy0 in front, and Joy1 in back. Standard Atari compatible switch-type joysticks plug into these ports. The front port, Joy0, can also support a mouse. Unlike the Atari 8-bit computers, the DB-9 ports on the 520ST will *not* support paddle controllers.

The two ports are each four bits of an eight-bit I/O port located directly on the 6301 Microprocessor that controls the keyboard. While these are normally *input* ports, they may also be set as *output*. HOW to set them as output is beyond the scope of this article. (Which gives you something to do, eh?)

The 6301 Keyboard Controller has the responsibility of keeping track of which key is pressed, where the mouse is, what state, (if any), the joysticks are in—and then communicating this information to the main 68000 processor. To know what to do, the keyboard is able to receive commands as well as report events. Sure enough, in the Atari Developers Kit documentation you can find at least two different ways of sending commands to the keyboard.

WHAT GOES ON?

In a nutshell, if we just wanted a joystick reading the process would go something like this: Send a joystick interrogation command to the keyboard, then wait in a loop until your joystick interrupt routine signals a "joystick packet" has been received from the keyboard. Now read the desired bytes out of the joystick packet. Sounds easy, right? Read on. . .

JOYSTICK ALA MODE

The joystick handler for the 520ST will operate in one of five modes: Disabled, Monitoring, Keycode, Event Reporting and Interrogation. While this is more complex than an Atari 8-bit joystick, with complexity comes power. Let's closely examine each of the available modes.

DISABLED— This is the mode TOS powers up in. Neither one of the ports are scanned or monitored for joystick information. To read information, the keyboard must be told which type of joystick scan to perform. To disable joystick reporting:

C Source code	**68000 Assembly**
#define IKBD 4	move.w #$1a,-(sp)
:	move.w #$4,-(sp)
:	move.w #$3,-(sp)
:	trap #13
Bconout(IKBD,0×1a)	addq.w #6,sp

MONITORING—Here we can instruct the keyboard to scan the joysticks every *N* hundredths of a second. Because this mode is incompatible with the default IKBD (Intelligent Keyboard) handler, users are encouraged to use another type of report, (keycode, event, or interrogation) or write their own IKBD handler. Monitoring mode is used mainly in game programming rather than general purpose programming.

KEYCODE—This mode allows the joysticks to return standard cursor key make/break control codes. The stick directions will emulate the cursor arrow keys and the joystick fire buttons will return $74/$F4 for Joy0 and $75/$F5 for Joy1.

EVENT REPORTING—This mode causes the joysticks' status to be reported every time a Joystick Event is detected. A Joystick Event is the closure or release of a joystick button or the physical movement of the joystick itself. This mode is supported by the default IKBD handler, but as the joysticks are initially disabled, the event reporting mode command ($14) must be sent to the keyboard first before any joystick information will be reported. Sample code to enable event reporting looks like:

C Source code	68000 Assembly
#define IKBD 4	move.w #$14,-(sp)
:	move.w #$4,-(sp)
:	move.w #$3,-(sp)
:	trap #13
Bconout(IKBD,0×14)	addq.w #6,sp

INTERROGATION— This mode causes the joystick status to be reported every time an interrogation command ($16) is sent to the keyboard. This mode is also supported by the IKBD handler. But because the joysticks are initially disabled, you must first send an interrogation mode enable command ($15) to the keyboard. Sample code to enable interrogation mode is as follows:

C Source Code	68000 Assembly
#define IKBD 4	move.w #$15,-(sp)
:	move.w #$4,-(sp)
:	move.w #$3,-(sp)
:	trap #13
Bconout(IKBD,0×15);	addq.w #6,sp

To actually interrogate the joysticks, command #$16 is used, as in the following example:

C Source Code	68000 Assembly
#define IKBD 4	move.w #$16,-(sp)
:	move.w #$4,-(sp)
:	move.w #$3,-(sp)
:	trap #13
Bconout(IKBD,0×16);	addq.w #6,sp

INITIALIZATION

There is a row of nine addresses in memory called the Intelligent Keyboard Vector Base Table (IKBDVBASE). These addresses (numbered 0 to 8) are vectors which point to the different subroutines that will be performed whenever their associated keyboard interrupt is generated. Vector #6 is the pointer to a routine that handles the joystick interrupt.

To find vector #6 and *activate* the joysticks, we must first locate the beginning of the vector table. This is accomplished with BIOS #34, Kbdvbase(), which returns a LONG pointer to the start of the table. We now need to place the address of our own joystick interrupt routine in vector #6, so we take the LONG pointer returned from Kbdvbase(), add 24 to it—to account for six entries of four bytes each—and the result is where we place the LONG address of our own joystick interrupt handler.

To *read* the joystick, using Interrogate Mode, send an "interrogate joystick" ($16) command to the keyboard. Now sit in a loop for a short time while the keyboard computer reads the joystick ports and assembles the joystick *packet*.

BACK PACKET

This packet is nothing more than a collection of data the keyboard sends back about the state of the joystick. It comes in two forms—each two bytes long.

For Event Reporting Mode, the first byte in the packet is an identifier byte that describes which joystick the information comes from. Joy0 is identified by $FE and Joy1 is $FF. The second byte describes the bit pattern of the joystick press. Using the form: bxxxRLBF, bit 7 (b) denotes when the fire button is pressed. Bits 3, 2, 1 and 0 (R, L, B, F) are set whenever the joystick is pressed Right, Left, Back, or Front. Bits 4-6 are unused.

In Interrogation Mode, every time an interrogation command is sent, *both* joystick states are returned. The first byte in the packet is the bit-pattern from Joy0, and the second byte comes from Joy1, using the same bit-format as in Event Reporting Mode.

HANDLING PACKETS

When the 520ST has assembled the joystick packet, it loads the address of the packet into a0 (and the stack) and then jumps through the (new) joystick interrupt vector. The joystick interrupt handler code should (at least) first save to the stack all registers used, then set a flag to show that a new joystick packet has been received.

Be sure and transfer the packet to your own buffer quickly, before a new packet is generated and overwrites the old packet. Then unstack and restore any registers used before returning through a RTS. Don't take more than 1 millisecond to do your interrupt work. And keep in mind this interrupt routine is performed within supervisor mode.

SAMPLE PROGRAM TAKE-APART

Examine Listing 1. This is a demonstration of joystick access using Interrogate Mode. It is written in Developers Alcyon C. At the top we have the typical **#includes** and **#defines**. **CON** stands for Consol—or video display—**IKBD** for Intelligent Keyboard and **CR** and **LF** for Carriage Return and Line Feed.

continued on page 56

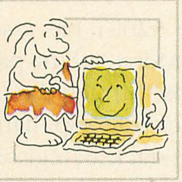


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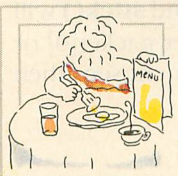
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Right under the integer declarations we have built two **structs**, or structures. These are arrays of information that can be manipulated easily from C. We build the first structure, called **ikbdvbase**, out of nine long words which each point to a different routine in the keyboard vector table. The next structure, **savesys**, is an image of the first, so we don't need to declare it. It will later be used to restore our original vectors.

MAIN()

In our **Main()** routine, we **initialize()** this application, **do** print out the values for stick(0) and stick(1) until [CONTROL] [C] is pressed, and then **terminate()** the application.

INITIALIZE()

To initialize the application, we first make our standard **v_opnvwk()** call and set a flag which will be used later. Next, we find the starting address of the keyboard interrupt structure from **Kbdvbase()** and place it into a LONG variable called **kbdvbase**.

Using this value, the next nine lines will transfer the current vectors in the keyboard structure into our **savesys** structure we set earlier. Next, point just the **joyvec** vector (the joystick interrupt handler vector) to our routine with **kbdvbase**->joyvec = &joystick which means, "The kbdvbase structure entry **joyvec** gets replaced with the address of **joystick()**." And now we send an enable joystick scan instruction to the keyboard with **Bconout(IKBD, 0x15)**.

TERMINATE()

To exit the program, we first stop joystick scan with the **Bconout(IKBD,0 x 1a)** command, then replace the used joystick interrupt vector, and re-initialize the mouse control for relative positioning. Finally, we close the workstation and exit the application.

STICK IT TO ME

The **stick()** routine sends the interrogation command to the keyboard computer, then waits while the keyboard reads the joysticks and assembles a packet. It waits inside the **do** statement which says, "Do nothing while flag is not set." When the joystick interrupt handler below receives a joystick packet, it will set **flag**, and **stick()** will continue. It resets the **flag**, picks up either packet[0] or packet[1], depending on which stick was chosen, then **returns** the joystick **state**.

INTERRUPT ROUTINE

This is the routine that receives the joystick packet from the keyboard handler. It is performed during an interrupt, and under supervisor mode. (By the way, any attempt to perform I/O from here will result in disaster. Do your work as quickly as possible and leave.) We are passed a pointer to the packet in register a0 and also on the stack. This means we can access this value from C by declaring it as we enter the C routine. We do this at **char buffer**[3], which will assign the value on the stack (our address) to the array called **buffer**[]. This routine does nothing but transfer two bytes from **buffer**[] to **packet**[], and sets the **flag** to show reception of a packet.

HEX OUT NOW

The next routine, **Pbyte()**, works with the following routine **Pdigit()** to print out values as hexadecimal numbers. These numbers allow the bit-patterns of the joystick ports to be more easily deciphered.

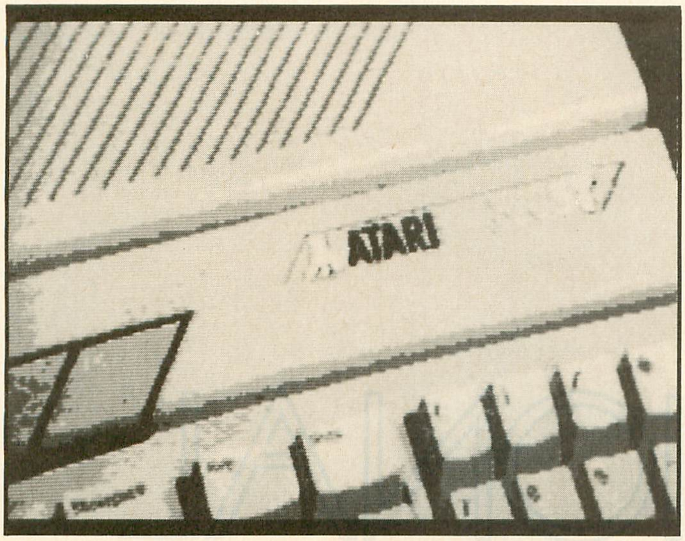
WRAP-UP

That concludes this short discussion of joystick access on the Atari 520ST. To give you a further example, we have included Listing 2, a bare-bones demonstration program featuring a bit of "Pong" and a taste of "Breakout".

As written, neither of these games are particularly challenging—or bug-free. But they will run on all resolutions and should provide a practical demonstration of ST joystick programming. Take them apart, put them together, and create your own version of "Galaxian Swamp Beetles."

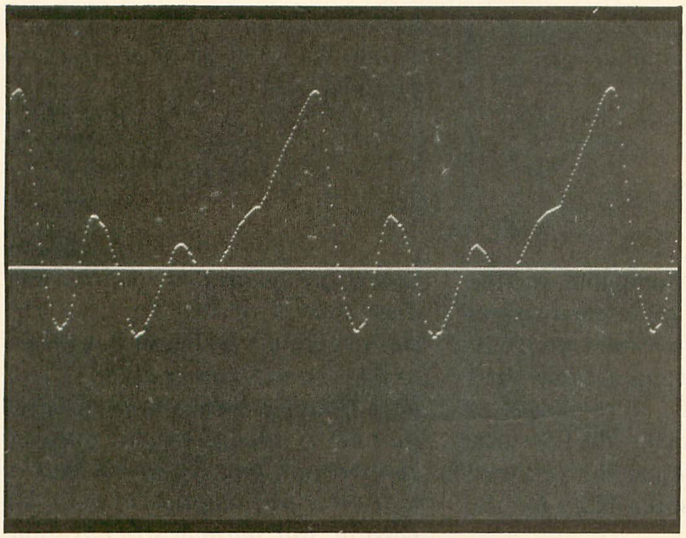
ST Resource would like to thank Richard Frick of Atari, and Dave Getreau, Senior Programmer at Atari, for his invaluable assistance and expertise on the subject of ST joystick control and the intelligent keyboard.—ST RESOURCE

Listing on page 128



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VIP PROFESSIONAL

1-2-3 for the ST?

Reviewed by GIL MERCIEZ

My mouth had been watering ever since the first ads for **VIP Professional**, a Lotus 1-2-3 clone with the GEM interface, began appearing last July.

Finally, after months of missed shipping dates (all too common in the computer industry), VIP Professional arrived on dealer shelves in mid-December. The price had now jumped from the introductory $99 to $179.

The impressive, shrink-wrapped package featured screen shots of drop-down menus and windows on a desktop spreadsheet. Only after opening the package and scanning the "Read Me First" pamphlet did I discover that the VIP I had just purchased was a "text version" minus the GEM interface.

The GEM version, explained the pamphlet, was too large to fit into the memory of the ST with TOS still disk-based. As soon as TOS ROMs were available, I would be able to get the GEM version I assumed I had already bought—for an additional $19.95.

To add insult to injury, the initial release of Professional was so full of bugs as to be totally unusable. And the customer service representatives refused to talk to customers until VIP received their registration cards. I was shuttled from VIP Technologies to Shanner International—the firm marketing VIP Professional. Both claimed the other had responsibility for the product.

Rarely have I seen such a debacle with a new software release.

After VIP received my registration card, however, things slowly began to change. The mute customer service at VIP changed to curt exchanges and finally to helpful responses. Updated versions of Professional, which fixed many of the early bugs, were sent to dealers to be distributed to previous purchasers. An even more solid text version was finished in mid-January. The $19.95 GEM upgrade charge was eliminated with the promise that all registered owners would be sent the GEM version as soon as it was available.

At last I could smile about my purchase.

*(As **ST Resource** goes to press, VIP Professional and Shanner International are embroiled in litigation over control of this product. VIP claims Shanner no longer has a right to sell it, and Shanner claims it still does. However, both companies agree that VIP is responsible for customer support and that registered owners will get a free upgrade to the GEM version. But Shanner still has some VIP software packages in stock and VIP seems uncertain whether or not it will provide customer support for owners of VIP Professional packages sold by Shanner after litigation began. These questionable packages are identified by serial number. **ST Resource** recommends that anyone purchasing this product first call and give the the serial number to VIP for the latest status.*—ST RESOURCE)

VIP Professional is an integrated package that combines the functions of spreadsheet, database, and presentation graphics into one program. Designed as a Lotus 1-2-3 Release 2 clone, VIP Professional represents the first serious business application available for the ST.

Those with a working knowledge of Lotus will feel right at home with

Professional. The command structure is identical. Spreadsheets and templates can be transported from Lotus to Professional and vice versa. A virtually unlimited number of applications are available.

One note of caution. Lotus 1-2-3 Release 2, which appeared last September, has a few compatibility problems with the more established Release 1A—particularly in the way labels are treated in formulas. You may also run into these same problems with Professional.

Professional is first and foremost a spreadsheet. A spreadsheet is nothing more than a grid arranged from columns and rows of cells in which labels, formulas, and values can be entered and manipulated. The idea is rather simple, but applications can range from very basic to extremely complex. Professional provides 8192 rows by 256 columns. More than 2 million cells!

The database section of Professional uses the same cell format and functions in combination with several powerful data commands. Combining spreadsheeting and database functions allows for powerful applications ranging from complicated home budgeting and tax preparation to inventory control in large corporations. Financial planning and forecasting can be handled with ease.

The graphics portion of Professional allows you to construct color displays of bar graphs, stacked bar graphs, pie charts, line graphs and xy graphs. The speed of display is impressive as are the results. Graphs can be saved to disk and printed with a utility program provided on the master disk. Further enhancements such as font styles and borders will be added with this utility.

Novices to spreadsheeting will find the multitude of commands and functions bewildering. You will not master Professional overnight.

The 250 page spiral-bound manual does an excellent job of explaining the essentials of spreadsheet manipulation and lays a foundation for more advanced concepts. The manual is divided into a tutorial and a reference section. While not all commands are covered in the depth that I would have liked, a bibliography is provided for further reference. Any of the many Lotus books crowding bookstore shelves will apply to Professional.

Also included is a handy fold-out reference card with a summary of commands. An online help feature can be called at anytime from within Professional, provided that the help files are on your disk. Page references to the manual are provided from the help screens.

In my job, I am constantly filling out financial statements in computer-coded forms, adding and manipulating them, and calculating various financial ratios from them. With Professional, I was able to design a spreadsheet that took all the drudgery out of this chore.

I had tried this project a couple of years ago using VisiCalc and my 8-bit Atari, but abandoned it after a few weeks. It took more time than calculating the figures manually, VisiCalc had too many limitations, and disk access was too slow.

With Professional I can vary individual column widths, use labels that spill over to the next cell, and incorporate macro commands into my spreadsheet.

Macro commands take much of the tedium out of entering data onto a spreadsheet. Using the /0 macro, which autoruns as soon as a file is loaded, I virtually eliminated manual cursoring. I was able to construct customized menus in which one keystroke eliminated more than 25 strokes for printing a portion of the spreadsheet. Ranges of cells can be named allowing the macro to address the name rather than having to remember its specific range. It's a mini language in itself and one of my favorite features.

Currently, Professional only supports Epson-compatible printers but will support more as device drivers for TOS become available. The text version of Professional is huge, taking up more than 280,000 bytes of a disk. The master disk contains an AUTO folder which will allow Professional to autorun when you have the TOS ROMs. If a template or spreadsheet is renamed to AUTOVIP it will automatically load on bootup if that file is in one of the online drives.

Hard disk support, essential to business applications, is mentioned in the package. But I was unable to verify this at this time. Hopefully, hard disks should be available for the ST by the time you read this.

After a rocky start, VIP Technologies appears to have gotten back on track. My only complaint on the latest text version is the somewhat slow screen scrolling which is attributed to having to update 32K of screen memory as opposed to 2K on an IBM PC. Tom Nelson, marketing director for VIP, said that code optimization on the GEM version is underway which should solve that particular annoyance. He also emphasized the importance of sending in the registration card in order to be eligible for the GEM upgrade.

I am anxiously awaiting the GEM version of Professional which should be available by the time you read this. VIP is an important product in establishing the ST line as a credible productivity tool both at home and in business applications.

(*Gil Merciez will follow up this review with a look at the GEM version of VIP Professional as soon as it becomes available. Watch for it soon in the* ***ST Resource***. —ST RESOURCE)

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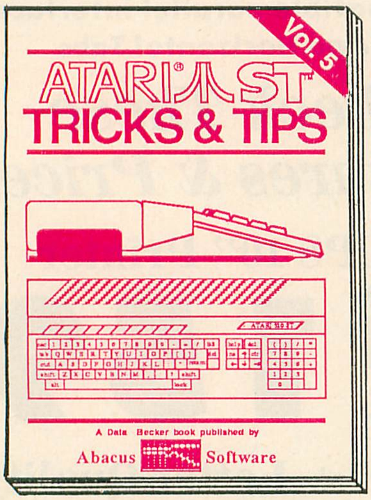
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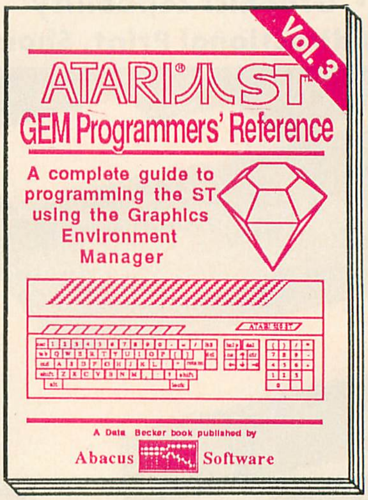
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PASCAL AND MODULA-2 FOR THE ST

Personal Pascal

Reviewed by CHRISTOPHER CHABRIS

Optimized Systems Software, the people who wrote DOS, BASIC, MAC/65 and ACTION! for the 8-bit Atari Computers, have entered the growing market for ST development tools with **Personal Pascal**. As might be expected by those familiar with the OSS reputation, this comprehensive and well-documented package firmly establishes Bill Wilkinson's company as a top supplier of high-quality ST systems software.

With Personal Pascal, OSS has attempted to provide a complete language system for ST users who want to develop professional-quality applications. The software comes on one single-sided disk and consists of editor, compiler, include files, linker, libraries, and demonstration programs. There is also a desktop-style "Manager" program that ties everything together by providing an integrated development environment much more straightforward and friendly than the standard C command-driven system.

To begin a programming session, double-click on the PASCAL.PRG icon to run the Personal Pascal Manager. From here, choose "Edit" from the file menu to summon the text editor.

I reviewed version 1.0 of Personal Pascal, which included a traditional keyboard-based screen editor reminiscent of the editor in the 8-bit ACTION! cartridge. Even the totally mouse-bound should have no problem here. It uses the top screen line for status information, leaving the other 24 for text. The entire keyboard, including the function keys, is used for cursor control and command entry, and all operations are mnemonic. Also, if you're a veteran of WordStar, you may use the same control-key commands.

The editor can be told to automatically backup your files, and it offers two special features: autoindent and chaining to compilation. When autoindent mode is on, pressing [RETURN] will indent the cursor on the next line to the same character position as the beginning of the line above it. This makes it easier to produce readable code. When you are through with an editing session, pressing [F9] will save your file, then automatically compile and link it, returning you to the normal Manager screen upon completion.

DEMO LISTING

Before we discuss the compiler itself, look at Listing 1 in the Software Library section. This is a sample Personal Pascal application that I wrote in a couple of hours after a quick reading of the manual. It will present the GEM Item Selector dialog, allowing the user to select a file, then count the number of lines of text in the file. The result is reported in an alert box, and the process continues until the user clicks the Cancel button in the Item Selector.

The source code for this program is 1740 bytes, and the executable file—produced by compiling with default options—is 8939 bytes. From the editor, the entire compile-and-link takes less than two minutes on a single-sided, one-drive system. With all the necessary programs and files on the disk, there is still about 60K available as disk workspace. Personal Pascal is compatible with both RAM-disks and hard disk drives for even faster program development.

Personal Pascal adheres to the Level Zero 1982 ISO Pascal Standard, with several common extensions and many ST-specific library subprograms and language directives. It is an excellent language for use with both introductory university computer science courses and the Advanced Placement Computer Science curriculum in high schools.

Personal Pascal provides a full implementation of the standard language. The only significant omission is the conformant-array parameter found only in the Level One 1982 ISO Standard. (Conformant-array parameters allow procedures to receive array arguments without knowing their exact dimensions. For example, you could create a library of generic matrix manipulation procedures.)

Useful extensions for structured programming include the LOOP EXIT-IF END construction, which makes its test in the middle of the loop—in contrast to WHILE and REPEAT-UNTIL, which test at the beginning and end, respectively. Other extensions include predeclared subprograms for string manipulation, bit-shifting, file management, clock access, program chaining, and command line argument retrieval. Five ST-specific language directives are provided:

• **EXTERNAL** allows Pascal programs to call subprograms written in assembly language. The documentation gives some information on the internal format of the various data types and the protocol for parameter passing, but it could be more complete.

• **C** does the same for subprograms written in compiled C. To be used by a Pascal program, external and C subprograms must be in object code format and linked to the compiled Pascal program.

• **BIOS**, **XBIOS**, and **GEMDOS** are directives that each take an integer constant as argument and execute the corresponding BIOS, extended BIOS, or GEMDOS function. The manual is very sketchy on the use of these directives, but one of the demonstration programs provides an example.

The Personal Pascal compiler produces .O object files directly without an intervening assembly step. These files can be linked either with the supplied linker (called from the Manager) or with the linker supplied in Atari's Development Package. Files intended for either linker are compatible with the other.

Native-code compilation has the advantage of speed which I personally feel outweighs the benefit of having assembly language source code output to modify before assembling yourself. My experience makes me confident that the Personal Pascal compiler generates efficient code for my applications.

GEM SUPPORT

The area where Personal Pascal really shines is GEM support. OSS has provided a library of procedures and functions, called PASGEM, that greatly simplify the task of programming for GEM VDI and AES routines. With Personal Pascal, it is easy to start programming with windows, menus, and dialog boxes without having ever seen Atari's monstrous development package.

GEM's basic services are divided into the following categories: Initializing and Exiting, Alert Boxes, Dialog Boxes, The Menu Bar, Window Management, Window Text and Graphics, Mouse Control, Event Management, and Miscellaneous Routines. For each of these areas, Personal Pascal provides one or more subprograms to control the GEM features.

In designing this interface to GEM, OSS chose to disregard the bindings and standard calls used in the ST Development Kit software (C and assembly language). The Pascal routines have many similarities with those discussed in the GEM VDI and AES manuals, but they are essentially a reworking of the system. Of course, they themselves make calls on the ROM GEM routines at the machine language level, but to the Pascal programmer they are a different set of routines.

As far as I am concerned, OSS has made the right choice in reworking the GEM calls in this fashion, and has done it well. I found it quite simple to write the CountLines program (Listing 1) using a few common GEM facilities, within minutes of first running Personal Pascal. In my experience the supplied routines work perfectly. It is true that not every single GEM call is supported by Personal Pascal, but all the essentials are there. Assembly language or C programmers can add whatever functions they need and link them to compiled Pascal programs.

283-PAGE MANUAL

However, the most important aspect of Personal Pascal's GEM interface is its accessibility. The manual devotes nearly half of its 283 pages to the GEM/Pascal Library, carefully explaining each sub-program and discussing global issues like event management and user-interface philosophy. This documentation can never fully replace Atari's own, but it does a better job of teaching GEM programming and giving programmers a quick start in producing applications.

The manual also adequately documents the Manager program, editor, compiler, and linker. Strangely though, the documentation leaves its reader wanting more. This is not because the documentation is incomplete. It is because the reader wishes OSS could have answered all the other questions about the ST. 138 pages are just not enough to provide all the information necessary to produce a professional ST program. What about BIOS, XBIOS, and GEMDOS functions? What about the Line-A graphics routines that include bit-block transfer and seed-fill operations? What about controlling peripherals?

If you have Atari's $300 Development Package, you can answer some of these questions within Personal Pascal. For example, to write a subprogram to control the ST sound chip you need to determine from the BIOS Technical Reference Manual what parameters need to be passed to which XBIOS function number—information that is stamped "Confidential" and not generally available.

OSS is currently working to address all of these areas. But even without complete documentation on all

continued on next page

aspects of ST programming, Personal Pascal will be more than adequate for most user projects.

There is little to dislike about Personal Pascal. A few minor bugs in the first release were quickly fixed. By the time this review is published, a new version should be available. According to OSS, it will feature a GEM-based program editor capable of handling multiple files simultaneously in separate windows, more GEM support and documentation, more Pascal extensions, and improved code generation. Conformant-array support is under consideration. Additionally, a BIOS/XBIOS/GEMDOS support library with full documentation was to be available in March. Finally, if you want to distribute your Personal Pascal software commercially, OSS only requires that you visibly acknowledge the role of their product in developing yours. No royalties.

Anyone who is considering programming the ST, with or without the GEM interface, either commercially or as a hobby, should also consider purchasing Personal Pascal. OSS has always followed up on its quality products with free newsletter, voice telephone and BBS support (you have to pay the long-distance company, not OSS). Like the TV commercial says, when you buy Personal Pascal, you buy a company. This is the best feature a software package can have.

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Listing on page 126

Modula-2 /ST

Reviewed by TIM OREN

Modula-2 is a relatively new computer language developed by Professor Niklaus Wirth, the inventor of Pascal. Like Pascal and C, Modula is a block-structured, compiled language. If you are used to interpreted BASIC, this means that any Modula code which you enter must be run through a program called a compiler, which converts Modula into machine code, which in turn is loaded into the ST and run. Block structuring means that rather than assigning statement numbers to lines, they are grouped in blocks by surrounding keywords. The blocks may then be used as one statement in IF or loop statements.

Like Pascal, Modula is a strongly "typed" language. This means you must declare all variables and routines before you use them. When they are declared they are given a type, such as INTEGER or CARDINAL. The compiler requires that you always perform operations on variables of like type. For instance, you would not be allowed to directly add a REAL and an INTEGER. However, there are type conversion functions to allow this. The purpose of this restriction is to prevent inconsistencies in the use of a variable from creeping into the code and causing errors.

Most of Modula's syntax is derived directly from Pascal. However, two important features have been added. The first is the concept of modules (hence the name). A module is a collection of routines which perform related functions. For instance, the routines to insert, retrieve, and delete information in a data structure might be combined into a module. The purpose of modularity is to divide a program into smaller, easier to understand pieces.

Communication between modules is by means of IMPORT and EXPORT lists, which define exactly what each module is allowed to know about the others. This gives you freedom to make any changes you want within a module, so long as the exported variables and routines still behave the same. Since the function of each module is well understood, you can reuse them in other programs and build up a library of code to speed your work.

The second addition in Modula is support for concurrent processes and co-routines. The language provides the ability to send messages and flags between modules which appear to execute simultaneously. The run-time library provided with Modula handles the switching between tasks. While many users may never require this facility, it allows Modula to be used for some projects which have required assembly coding up to now.

TDI MODULA-2

TDI Software of Bristol, England has acquired the rights to commercially distribute the Modula compiler and related software developed by Dr. Wirth. Modula-2/ST is their implementation for the Atari 520 ST. It is supplied on two single-sided disks, and includes the Modula compiler and linker, as well as a GEM-based program editor. The package has extensive library modules which provide the Modula run-time services and complete access to the ST's BIOS and DOS, and the GEM VDI and AES.

I tested TDI Modula on a 520ST with two single-sided drives and RAM-based GEM. Since I am fluent in C and have some knowledge of Pascal, I skimmed over a copy of Wirth's primer on Modula-2 to prepare and then worked my way through the examples given in TDI's manual. Finally, I modified the example programs both to experiment with the editor, and to create some error cases to test the compiler and the tools supplied.

PERFORMANCE

I found the compiler itself to be very robust and reasonably fast, even on a floppy-based system. While testing, I deliberately made coding errors which are apt to crash compilers, such as misarranging the block structure of

the program. In every case, TDI Modula correctly diagnosed the problem.

The compiler itself consists of a main program and a set of overlay files, which are loaded into memory one after another to perform the various phases of the compile. This makes for a good deal of disk I/O, but the Atari drives were up to it and the delays were not annoying.

The editor supplied with Modula is a straight-forward programmer's tool. Again, I found no bugs here. The linker which must be run after the compile to prepare the PRG file is quite fast, especially to anyone who has used the LINK68 program in the Atari developer's kit.

There is one major deficiency in the Modula-2 package: a debugger. Everyone makes errors, and the use of a breakpoint debugger is probably the best way to find the mistakes. The Modula linker does not produce a symbol file, so there is no way to substitute another program, such as the SID provided to Atari developers. The programmer must resort to inserting print statements within the program to get test output. This an important shortage in a language as sophisticated as Modula.

The only bug I encountered while using the package is actually a problem in GEMDOS (TOS). It seems that under some conditions the DOS does not free the memory allocated to a file when it is closed. After a while, it runs out of memory and just stops opening new files. This produces interesting effects such as Desktop windows which are empty, or compiler runs with no output! Given the amount of file accessing performed by Modula, I was forced to reboot after every three runs to avoid the problem.

ERROR HANDLING

TDI has come up with a clever way to handle compile errors. Instead of being written directly to the screen and then scrolling off the top, they are written out to an error file. When the editor next loads up the program's source code, the error file is also read, and the offending locations are marked. Positioning the edit cursor at the mark causes the error number and description to be printed at the bottom of the editing window. After fixing the error, you may delete the error marker or the editor will do this automatically when it writes the file out.

My only criticism of this scheme is that the error messages seem to be stored on disk, and the editor pauses to access them whenever the cursor hits an error mark. This can often be annoying when moving rapidly through the text. TDI could improve this feature by waiting for the cursor to stay in one place for a while before writing out the error.

Assembler and C programs which commit run-time errors on the ST are prone to disappear in a barrage of bombs, never to be seen again. So, it was a relief to see a friendly alert box appear on the screen when I deliberately caused a divide by zero error. This service is provided by the Modula run-time library which traps error conditions before they get to the ST's bomb code.

DOCUMENTATION

TDI Modula is provided with a single, wire-bound user's manual. This does not purport to teach you Modula. For that you are expected to buy one of the tutorial books available on the language. I chose *Programming in Modula-2* by Wirth himself, and found it adequate for an experienced programmer, but probably heavy going for a beginner.

Over half of the TDI manual consists of listings and catalogs of library functions. The remainder is a short tutorial on using the package, and slightly longer descriptions of the compiler, linker, and editor. I found the tutorial itself poorly organized and probably confusing to the beginner. No reference is made to where the various files may be found. You are expected to work it out yourself. While you must use the editor to enter the sample program in Chapter Two, the editor itself is not described until Chapter Four, and the keys which make it work are defined in Appendix B.

While TDI Modula includes a complete set of bindings (subroutine calls) for the BIOS and DOS, VDI and AES, they are documented only with one or two line entries showing their calling parameters. For more information, one is referred to the documentation supplied with the GEM manuals supplied with the Atari Developer's Kit. Since this kit costs $300 and includes an entire C compiler itself, this seems a rather questionable approach to the problem.

GEM ENVIRONMENT

When a generic piece of code, such as Wirth's Modula compiler, is moved from machine to machine you can expect to see some traces of the process. Although all of its components use the GEM windowing services, Modula-2/ST shows its non-ST origins clearly. Two examples will suffice.

The first problem is in the edit-compile-link-test cycle. The editor, compiler, and linker each bring up a file selector when they are run. You must then select the appropriate file, and edit the path if your file is on a different drive. This process can get quite annoying after awhile. It seems reasonable that TDI could overcome this difficulty, and make the whole system easier to use, by creating a supervisor program to move you between the various programs in the system without dropping back to the Desktop each time.

The editor is also minimally adapted from a text-only version. For instance, drag-selection of text is not possible. You must mark text blocks by positioning the cursor and selecting a menu item for both the beginning and end.

While the ST's cursor keys are used, augmented functions such as word left or end of line are clumsily placed on the function keys. Due to the ST's layout, touch typists must take their fingers off the home row to hit the function keys, which slows things down. Menu alternatives are provided, but this involves taking the hand entirely off the keyboard and performing two mouse actions. A frequent user will probably find the editor to be slow and a bit frustrating.

continued on page 70

TWO ST BOOKSHELF MUSTS

Reviewed by Patrick Bass, **Antic** ST Program Editor

ATARI ST INTERNALS

I have a lot of books already, but this volume easily found a place on my reference library shelf. With the exception of VDI and AES information, Abacus has placed, in one package, nearly everything needed for you to start programming the ST. **Atari ST Internals** has 448 pages packed with information for the user who needs to get work done *now*.

Abacus has covered nearly every aspect of the 520ST. There are chapters covering all the "off-the-shelf" chips inside the computer. The 68000 processor, 68901 MFP, AY-3-8910 sound chip, WD1772 Disk controller and the 6850 ACIA are thoroughly described, complete with chip pinouts and programming models. But even more important, the book provides detailed examinations of the four *custom* chips—MMU, DMA, GLUE and SHIFTER.

MMU is the Memory Management chip that controls how the 68000 accesses RAM/ROM memory. DMA is the Direct Memory Access chip which transfers memory from here to there, *very quickly*. GLUE does just that, replacing many separate ICs with a single package for controlling basic system timing. It literally GLUES the other chips together electrically. SHIFTER is a very fast video-bit shifter that transfers the video information from memory to the display screen.

There are excellent chapters on the different interfaces to the 520ST, including descriptions of the keyboard, mouse systems, video, Centronics parallel port, RS-232 port, the MIDI connection, the cartridge slot, the hard/floppy disk and the DMA interface, along with programming examples for each.

An entire section is devoted to the ST Operating System, and goes into great detail on each BIOS and XBIOS call available. Abacus has even included a section on how to use the "back-door" into the 520ST—the Line-A interface—along with sample programs.

Exception processing is covered in the section that describes the interrupt structure of the 520ST, and gives examples of how to access the Vertical and Horizontal Blank routines already set into the 520ST. The included VT-52 emulator is covered.

Also covered are the known "cast in concrete" system variables down on Page 4. True, **Antic** introduced these in the September, 1985 issue. But the Abacus book adds sample values and explains what these values mean to the 520ST. Very nice.

Finally, after a short discussion about the 68000 in general, the last third of the book has a printed, commented listing of the Operating System, TOS. I spend most of my time here. Right here in one spot are hundreds and hundreds of programming examples for access into GEM and TOS, written by the same people who brought out the 520ST. (The horse's mouth!)

Them's the picks, now come the nits. Who proofread this book? Zippy the Pinhead? There are so many typographical errors that I stopped counting. The project was obviously rushed to print. Also, the programming examples included in Atari ST Internals are in 68000 assembly language, which tells me they assume the reader is familiar with the 68000. Not everyone is— yet. And hey, folks, get this:

continued on page 70



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BOOKSHELF MUSTS
continued from page 68

448 information-packed pages and NO INDEX in the back of the book. What is this about computer books without indexes? Have we no databases? Nevertheless, this is an important indexless book to have.

ATARI ST MACHINE LANGUAGE

If you have a 520ST and feel you need to begin learning 68000 Machine Language (if only to understand the examples in the book reviewed above), you might try **ST Machine Language** from Abacus.

While other books on 68000 programming are more comprehensive, ST Machine Language not only explains the workings of the 68000, it also gives examples of program code written for, and *on*, a 520ST. To use the examples in the book you will need a 520ST and practically any 68000 assembler. The assembler in the Atari ST Developers Package or the Haba Hippo-C assembler will work fine.

This book assumes the reader is already programming in a higher-level language (like BASIC or C) and wants to learn 68000 assembly language. It was written, however, so that anyone interested in computers can glean information from it.

I admit that my first impression of this book left me lukewarm. But a closer examination, along with the weight of sample programs included, swayed the benefit of doubt over to Abacus' side.

Caveats here include as many typographical errors as in the other two volumes Abacus released for the 520ST. (**Presenting the Atari ST** was reviewed in **Antic**, October 1985.) And don't look for an index in this 277-page book either.

ATARI ST INTERNALS
ATARI ST MACHINE LANGUAGE
Abacus Software
P.O. Box 7211
Grand Rapids, MI 49510
(616) 241-5510
$19.95 each

TWO NEW LANGUAGES
continued from page 67

OVERALL

Because of the merits of the language itself and the quality of the compiler, TDI Modula-2 has the potential to be a great product. However, insufficient attention has been paid to adapting it to the ST. In addition, TDI seems to be confused over who might buy this package.

For the amateur programmer interested in trying something beyond BASIC, the $149 price tag is rather steep. A Modula textbook will have to be purchased in addition to the manual. The TDI manual itself requires some puzzling to get started with the package.

For the professional, the level of operating system and graphics support provided is inadequate. Anyone expecting to do serious work will also have to purchase the $300 developer's kit from Atari. The lack of a debugger will be especially felt in any large project.

This reviewer would like to see TDI either upgrade this product, or release a second version of Modula for the ST. The compiler itself is good enough that an adequate set of support tools could make this into a truly excellent language for the Atari ST.

MODULA-2/ST
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Tim Oren needs little introduction to members of the ST developers community. Currently user interface designer with Activenture—the firm which designed the CD-ROM software for the ST—Tim was previously involved with Digital Research in designing GEM. He is also the author of DR LOGO and the Resource Construction Set. ***ST Resource*** *readers who want to get to know Tim better should take a look at his highly informative Professional GEM columns in the ST SECTION of ANTIC-On Line on CompuServe*

68000 EXCEPTIONS & INTERRUPTS

by DAVID and SANDY SMALL

*The February 1986 issue of **ST Resource** published* ST Crash Clues, *a brief introduction to 68000 exceptions. In the next three months, David and Sandy Small will give us a much closer look at the same subject.*

—ST RESOURCE

The following is the first in a series of articles discussing 68000 (and 6502) interrupts and exceptions—in detail. Along the way, many important concepts underlying the ST's 68000 architecture will be discussed. This series is aimed primarily at the intermediate to expert programmer. But it has information of interest to nearly anyone—namely, "What are those bombs doing on my screen?"

Because many **ST Resource** readers—as well as most newcomers to the 68000—are more familiar with the 6502 processor used in 8-bit Ataris, (as well as Apple IIs and Commodore 64s), we'll begin with the 6502 and use it as a base of knowledge to understand the 68000's interrupts and exceptions. In fact, some of the starting concepts of this topic are pretty much the same on both microchips.

Before we roll up our sleeves, I should mention that throughout these articles I've sprinkled something I call: <Hacker Notes>. To some, the term "hacker" has negative connotations. It implies a *WarGames* sort of destructive mentality. To me, this is totally inaccurate. "Hacker" used to be a very proud term signifying: 1. Freedom of information exchange and 2. Freedom of creativity. We "hackers" knew what the term really meant long before the national press picked it up as an instant buzzword for the relatively few who abuse computing. (*See* Hackers Forever *in the September, 1985 **Antic** for more on this.*—ST RESOURCE)

I write articles like these because I believe in freedom of information exchange. Much of this information was dearly won, but with it you can create much more easily (the second ethic) and not have to cover the same ground. I always found that when I give information away for free, it has a way of returning manyfold via the informal and incredibly effective hacker's network.

So if the Hacker's Ethic appeals to you, take the information here and use it to create something! And if you're in the mood, let me know what you created. One good way: my CompuServe ID is 76606,666. And in ANTIC ONLINE, and the SIG*Atari developer and 16-bit sections on CompuServe, there are a great information exchanges filled with hackers willing to share information, program code and the like.

INTERRUPTS: OVERVIEW

What's an interrupt? It's a request for the CPU (central processor unit) to suspend whatever it is doing, and go do something else. When the CPU is finished handling the interrupt, the processor goes back to what it was doing in the first place.

Some fast definitions:

Interrupts are serviced (handled) by an "interrupt service routine." This routine is a specialized piece of code that deals with the interrupt and then exits back to the "main routine"—which is the code that the CPU was ex-

ecuting when it was interrupted.

Why interrupts at all? Because they are quite handy. An analogy will illustrate this: Consider the problem of answering your front door when someone shows up. A good example of an interrupt in real life is a doorbell. When the doorbell rings, you drop whatever you are doing and go answer it.

But if you have no doorbell, your alternative is to look out the front door every 30 seconds or so and see if someone is there. Most of the time someone is not there (at least in my neighborhood) and you end up wasting a lot of time. Computer people call this "polling".

So having a doorbell to interrupt you is much more efficient. You only spend time answering the door when someone is there.

Computers are the same way. If the computer has a great deal of time to waste, it can poll (look out the door) for things going on, without doing any harm. But if the computer is busy (which the ST and 8-bit machines definitely are) it hasn't got time to waste. Interrupts are the answer here.

What does an interrupt do, exactly? There are some common aspects to all interrupts:

1. Something happens that causes an interrupt. There is now an "interrupt pending." The CPU is notified that it needs to interrupt. It takes the location where it is currently executing at the program counter (PC) and saves it—usually on the stack. It also generally saves the current flags.

2. The CPU begins executing an interrupt service routine, which it finds in a specifically defined place.

3. The CPU does whatever the interrupt needs it to do. For instance, in a modem program it might receive a character that was just input and store it away for later processing.

4. The CPU *clears* the source of the interrupt, so there is no more interrupt pending. In other words, the current cause of this interrupt is satisfied and the CPU won't interrupt again because of it. In a modem program, this would prevent us fetching the same character multiple times.

5. The CPU restores its program counter and the flags from the stack, and thus begins executing the main routine where it left off.

All of the above is common to both the 6502 and 68000 processors. However, the low-level details are not the same between the two processors. I want to begin with a generalized overview to keep things in perspective. Since most readers approaching the 68000 for the first time are acquainted with the 6502, let's talk about that processor first.

There has already been a lot of information printed on the 6502 interrupt scheme. Since the main intent of this series is to educate about the 68000, I'll avoid the intricacies of the 6502 not also applicable to the 68000. The remainder of this first article in the series will concentrate on the features in the 6502 which are similar to the 68000.

6502 INTERRUPTS

In the Atari 8-bit machines, there are two types of interrupts. One is "maskable", the other "non-maskable". These terms define whether or not you can shut off that particular interrupt. For instance, if I'm executing a piece of CPU code that absolutely must *not* be interrupted, I can "mask off" a maskable interrupt. Think of masking tape—keeping paint from where you don't want it—and you'll have the idea.

A maskable interrupt is often called an IRQ, which stands for "Interrupt Request".

Non Maskable Interrupts (NMI) are a different breed. They happen whether you want them or not. They are reserved for things that absolutely *must* interrupt you—regardless of the consequences to your program. In the computer world, they are like being pulled over by a traffic cop. Note the lack of the word "request" in NMI. It's not a request, it's an order!

On the 8-bit Atari, Maskable Interrupts are:

- Serial Bus stuff. . . talking with external devices (disk drives, modems, and so on).
- POKEY timers (generally, sound generation).
- Keyboard. . . someone pressed a key.
- [BREAK] key.

As you can see, these are all high priority sorts of things (sound, for instance, just can't wait). But also they are things that a program might want to shut off, such as a program that doesn't want sound.

As I mentioned before, you *can* choose to shut off these interrupts. One way is with the 6502 SEI instruction, which turns them all off, regardless. (6502 CLI turns them back on). If you need just *some* of them, then you must write to a hardware register, IRQEN (Interrupt Request Enable), specifying just which of these interrupts you want to work and which you don't.

The 6502 Non-Maskable Interrupts are:

- System Reset key (Wouldn't want to ignore that!)
- Vertical Blank: This is critical to the video display, and the video just can't wait.
- Display List Interrupt: Again, this is critical to the video display.

The first, System Reset, is something you would never want ignored. The second two are made non-maskable because the video must constantly receive information from the Atari to keep its image onscreen. Remember, the video must "refresh" (be told) all its display information each 1/60th of a second. So vertical blank and display list interrupts cannot be delayed.

<Hacker Note: The newer Atari 8-bit models make System Reset a true reset, a special sort of interrupt I'm not going to discuss here. The intent was to fix a bug in the old computers. If the 6502 executes some particular illegal opcodes, it will lock up so completely that even an

NMI will be ignored. The only way to get it restarted is with System Reset. It represents a "Get Out Of Jail Free" card. I mention this to help avoid confusion.>

<Hacker Note: There is a memory location that allows you to close down Non Maskable Interrupts if you have a Good Reason to do so. It's called NMIEN (Non Maskable Interrupt Enable) and it allows you to shut off the Vertical Blank and Display List Interrupts. (Normally, DLIs are off anyway). However, you'd better have a darn good reason to shut off the Vertical Blank; it is not something ordinarily done. A small bit of trivia is that you can't shut off the System Reset key. But it had better not be pressed when you power up the machine. Atari VCS (2600) game machine owners found that pressing the reset button while powering up had strange effects on games. . . like many extra players, invulnerability to missiles, etc. Now you know why.>

How does the 6502 handle interrupts at the assembler and machine level? Three ways:

Non-Maskable Interrupt (NMI): Go to wherever $FFFA points to.

System Reset: Go to whereever $FFFC points to. In other words, if the 16-bit address at $FFFC is "$1234", jump to $1234 and start executing. The important thing here is that this is a POINTER, not actual machine code. We'll be seeing lots more of pointers in the 68000, so I am pointing this out early. (Sorry about the pun.)

Maskable Interrupt (IRQ): Go to wherever $FFFE points to.

At the hardware level, there are two pins to the 6502 which are triggered to cause an interrupt. As you may have guessed, one is IRQ (Maskable Interrupt), and the other NMI (Non Maskable Interrupt). And, of course, there's always Reset.

Now, all these locations, $FFFA-$FFFE, are in system ROM, so you're stuck with whatever the system designers make interrupts do. Fortunately, the Atari designers gave an unprecedented amount of freedom to the user, so the interrupts are "vectored," or directed, to go through a RAM location—which you can alter if you wish—to process the interrupts. So, if you choose, you can redirect the interrupts to your own service routines rather than using Atari's default service routines.

In computerspeak, we are "revectoring the interrupt service routine."

An example? Okay: The serial bus. When the disk drive starts sending data to the Atari, the Atari must be listening in a certain way. This is because the data is coming from the disk drive at a fixed rate. And if the 6502 takes its attention from the drive, it'll lose some of that data. So incoming disk "serial" data generates an interrupt which quickly sends the 6502 off to listen to the serial bus and gather in the data.

<Hacker Note: You can't use the disk drive while the 850 interface is running in its concurrent mode for just this reason: The Atari is listening so hard for incoming characters it can't listen to the drive.>

There have been several disk speed-up programs that make the serial bus run even faster (which is no trivial task). Some examples are Warp DOS from Happy Computing or SynchroMesh from Indus. In these, the data is coming very, very fast from the drive—too fast for the Atari routines. So these programs redirect the Atari interrupts to a specially coded, ultra-high-speed handler that can handle these fast data requests.

<Hacker Term: Redirecting an interrupt is called "stealing the interrupt." The term is used so often that I thought I would define it for you.>

This pretty much finishes up our discussion of the 6502. Next month, I'll begin discussing the 68000—the reason most of you began reading this series in the first place. But now that we've laid the groundwork, we're ready to take off. The 68000, after all, is a close cousin of the 6502. It builds on the original—like a good sequel to a hit movie.

*David and Sandy Small are professional programmers and longtime contributors to **Antic** Magazine. David's* ST Uses IBM Disk Files *appeared in our November, 1985 issue. David and Sandy are co-authors of* Guidebook For Winning Adventurers, *which was reviewed in the September, 1985 **Antic**.*



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ST BASIC DISK I/O

Random access file control

by DAVID STAMBAUGH

The Atari 520ST computer breaks new ground for personal computer owners in the area of power per buck and graphics capabilities. But for those who bought an ST expecting to transfer their 8-bit Atari BASIC programming skills unchanged—hefty surprises are in store. One of the biggest changes is in the area of random disk file handling. And in this article I will give you a sample of how the ST handles random files.

RANDOM ACCESS

Basically, there are two different types of files—sequential and random. Sequential files are like a spool of recording tape. If you want to see what's at the end, you need to unwind the whole tape. That takes time.

However, random access files are like LP Records. To see what's at the end, just skip over everything else and start reading (or writing) wherever you need. This saves time because now you don't need to read 349 items to get to the 350th, you just move right to the 350th item and start reading.

PROGRAM BREAK-DOWN

Examine Listing 1. This ST BASIC program demonstrates how a random access file is created, written to and read from.

First, you establish some constants in lines 150-160, then clear and erase the output window. The OPEN command in line 190 is somewhat like the OPEN in 8-bit Atari BASIC. You assign the file number, the access type and the filename, but here you also tell it the length of the record. This is because ST random access files use fixed-length records.

OPEN SESAME

The command structure is: OPEN <mode>, <file number>, <filename>, <record length>. The mode can be O for sequential file output, I for sequential input, or R for random file access. The file number can be any number between 1 and 15, preceeded by the # sign. And, as far as I have been able to figure out, there are no pre-assigned codes such as the 6 was for 8-bit BASIC.

The filename is enclosed in double quotes and consists of a drive specifier (A: or B:), a filename with the familiar up-to-eight-letter-name period and up-to-three-letter-extender.

At the end of all this is the record length. This is optional and defaults to 128 bytes, but should be set at the length of your individual record. Random access files require that *all* of your records occupy the same amount of space regardless of their actual length.

RANDOM FIELDS FOREVER

The FIELD command, in line 200, sets aside space to be used as a buffer for the random file access. You don't directly move data from a string to the disk. Instead you move it to the buffer (described shortly) and then use the PUT statement to write the record to the disk, or the GET statement to read the entire record.

The format of this statement is FIELD <file number>, <field width> AS <string variable>, etc. For example: FIELD #1, 10 AS PHONE$, 25 AS PERSONAL$. This is a bit strange-looking if you are used to Atari 8-bit BASIC, so let's examine it more closely.

The file number is just like the OPEN command and can be from 1 to 15. Using the above example, the field width instructs the computer to use the first 10 characters as PHONE$, and the next 25 as PERSONAL$. One important thing to keep in mind is that the sum total of the field widths in the FIELD command should be *exactly* the same as the length specified in the OPEN command.

RSET & LSET

The RSET and LSET commands (line

290) move the data from the string variables you are using (A$ and B$ in the example program) to the buffer area for the random files (PHONE$ and PERSONAL$ in the example program). Do *not* try to re-assign the buffer string set aside to a variable value using a LET statement (LET PERSONAL$ = A$ or PERSONAL$ = A$). Doing this will simply move the variable pointer away from the buffer area and defeat what you're trying to do. RSET will right-justify the data as needed and either truncate or pad with blanks if needed. LSET does the same except that it switches to left-justification.

USING GET

The GET command (line 550) has the format of GET <file number>, <record number>, with the record number being an integer variable within the range of 1 to 32767. This command will read the next <record length from the OPEN command> number of characters from the file accessed through file <file number>.

The data is placed into the random access data buffer as outlined in the FIELD command. Your program then needs to move the data to the variables involved, using either the LSET or RSET command. It is possible to try and access data beyound the range of the actual file scope, so your program needs to somehow handle this potential problem.

PURSUING PUT

The PUT command (line 310) has the format of PUT <file number>, <record number> with the record number being an integer variable within the range 1 to 32767. This command will take the data in the random access buffer defined by the FIELD command and write it to disk in the <record number> position within the file.

When writing to the file for the first time, you *must* write the file in sequential order. Note that you must use the LSET or RSET command to move the data to the random access buffer before issuing the PUT command.

CLOSING IT UP

The CLOSE command (line 460) takes the form CLOSE #<file number>, #<file number>, etc. This *will close* the specified open file(s), flushing the data buffers to the disk if necessary. The file number is optional and issuing the CLOSE command without a file number will close *all* open files.

RANDOMLY ENDING

This brief introduction does not even begin to explain how to use numeric variables with random access files. (HINT: Look up the MKD$, MKI$ and the MKS$ commands.) Experiment with this feature, and see how fast you can access data.

Dave Stambaugh programs DEC PDP-11 computers for the Caterpillar Tractor Company in East Peoria, IL. Since 1982, he has owned every Atari computer model except the 600XL. He is a past president of the 400-member Peoria Atari Computer Enthusiasts.

Listing on page 136

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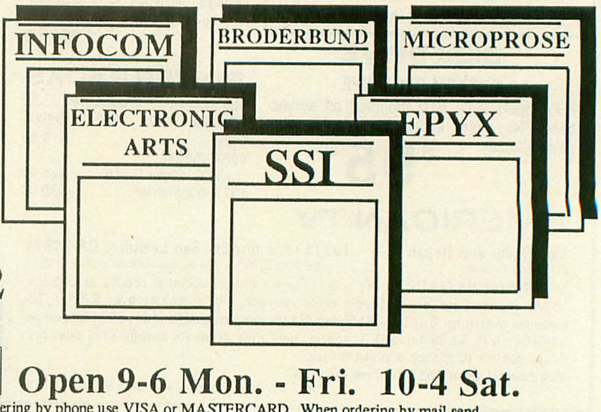
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ST PRODUCT NEWS

ST reviews

TREASURE ISLAND
Windham Classics
(Spinnaker Software)
One Kendall Square
Cambridge, MA 02139
(617) 494-1200
$39.95, ages 8-15

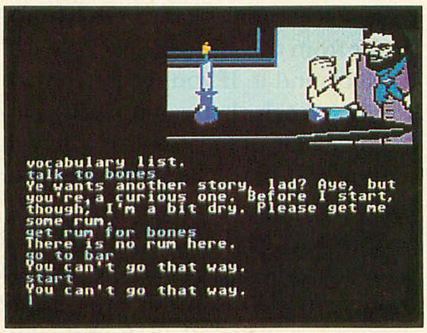
Reviewed by Sol Guber

"Shiver me timbers matey. Yo ho ho and a bottle of rum." Ah, yes—sailing on the *Hispaniola* and no land in sight. Hiding in the apple barrel and listening to the mutinous whisperings of the man with the black patch.

Based on the classic Robert Louis Stevenson novel, **Treasure Island** is a graphic adventure game that brings to life all the major characters of the book. It is designed for the young adventurer, about 8-15 years old.

There are two ways to look at this adventure game—either from the viewpoint of a young child who is trying to learn to read better and have an adventure, or as a sophisticated adult who has played many adventure games and expects a great deal from the package.

Although the package describes the age range for this game as 10 to adult, this does not have any of the trademarks of an adult game. The puzzles are not difficult. There does not seem to be any humor in the game. The language parser is average. There are no clever tricks or puzzles needing to be figured out. This is my adult view of the game.



On the other hand, my 8-year-old daughter Rebecca likes this adventure game. The graphics are not great, but she says it would distract her if the pictures were bigger and there was less writing on the screen. (The graphics and text use the 16-color, 40-column mode of the ST). She likes the idea of having a scene and a picture of the person to whom she is talking.

Rebecca also likes the list of vocabulary words supplied in the package. And there is a command called WORDS that lists all appropriate words for each individual scene. To her, this is a big help. (I did not bother to tell her that it also helps me.)

Finally, there is a large amount of help built into the first few actions. It is very easy to respond correctly when the computer prompts you, for example, that Bones is getting thirsty and wants something to drink.

Rebecca also appreciates the idea that there is no scoring in this game. And when you're near an object that is really needed later in the game, you cannot leave the vicinity of that object without picking it up. (This would have helped in Hitchhiker's Guide if you never thought of picking up the fluff.)

And Rebecca especially likes the SAVE feature. You can save at any of 10 positions. When you specify the position, you can also specify a 30-letter message to remind you next time of what is being saved there.

The big question is whether the game is playable by children, and will they want to play it. Rebecca took about 45 minutes to leave the tavern and get onto the ship. She was only killed once during the first chapter of the book and it was her own fault, because the computer told her that there were loud noises coming from the

continued on next page

parlor and she went to investigate.

In retrospect, each piece of the puzzle was logical and seemed fair. She got lost on the path to Bristol, but the computer helped her find her way. She thought the music being played was good and appropriate. It also quieted down to let her read the text.

The next day, she wanted to play some more and spent another hour aboard the *Hispaniola*. The lack of really good graphics was more bothersome now and she complained that the game seemed harder. There were fewer prompts and she carelessly fell overboard. However, she is continuing to play the game and thinks it is a good value. Having read the book, she knows what to expect, but this is not a real advantage.

I would give Treasure Island a B for effort and execution. The adventure is interesting and playable. The "Word Window" vocabulary feature is very helpful for getting through the puzzles and finding the treasure.

But I don't think the game uses many of the strengths of the ST. There is much disk information being transferred, even though the pictures are not full-screen. The pictures could be done in much more detail and the sound capabilities utilized more. Still it is a good first ST effort from Spinnaker and young adventurers will enjoy it.

KING'S QUEST II
Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
$49.95

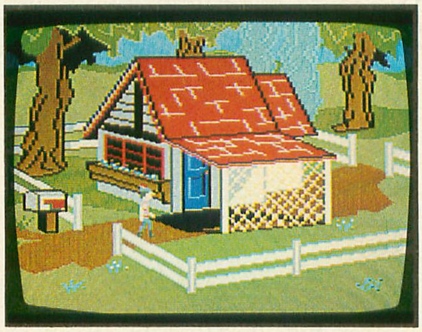
Reviewed by Brad Kershaw

I used to be a member of the I-Hate-Adventure-Games Club until I met **King's Quest II, Romancing the Throne**. This program is a breakthrough in game adventures. I say "game adventures" instead of adventure games because King's Quest II is mostly animation with a little typing thrown in.

The first thing I said when I saw this game was "WOW." And I didn't stop being amazed. You never know what you might encounter just around the next bend. It might be a beautiful beach or it might be an enemy stalking you.

You play the role of King Graham who must find three keys and free his loved one, so that he may regain his rule over the land. Sounds easy? It isn't.

Your royal alter ego is a little animated figure controlled by either keyboard or joystick. You begin your journey on the beach with waves crashing against the rocks in the background. Move King Graham to any



edge of the screen and, seconds later, the next picture screen loads in.

I still can't get over the graphics. The trees, buildings, lakes and ocean are all dimensionally correct. In other words, you can walk into a tree head-on, or from the sides, the back, or just walk around it. If you see a tree with a long branch that extends off onto the right side of the monitor, you will see the rest of the branch when you get to the next screen.

Each screen is colorful and detailed with a good feeling of atmosphere. I thought there could be only a few screens on one 3½-inch disk, but was I wrong! I counted at least 35 screens on the first disk alone. And there are two disks to the game.

As you travel about this strange land you may encounter other animated characters—each with his, her, or *its* own personality. You might recognize some of the characters from fairy tales and legends. And you will soon find out if they are there to help or hinder you.

Wandering through the vast kingdom, you find treasures to offer your betrothed—if you can locate her. You can search anything you see on any screen, from grass to rocks. You may find items to trade with other characters, or items useful for self-defense.

And when I say self-defense, I don't mean you use these items to fight other characters. King's Quest II is probably the least violent adventure game I have seen. I would rate it "G" for general players (families with younger children).

The story itself is very well laid out. It's obvious that a lot of thought was given to how the screens would fit together and how the characters would interact. The characters you will meet are delightful. Each one has a different facial expression and can move about as freely as you. And you *will* find yourself freely running from a few of them.

If all adventures could be this enjoyable and visually stimulating, I would have been an adventure game freak long ago. I found myself up until the wee morning hours, with just the monitor lighting the room, laughing and smiling at a new sequence I had discovered. Then I realized I was afraid I would complete my quest, and I didn't want it to end.

I read somewhere that Sierra On-Line is working with Walt Disney Studios on a Black Cauldron game. I guarantee that when it becomes available for the ST, I—the guy who hated adventures—will be first in line, checkbook in hand.

FAHRENHEIT 451
Telarium Software (Spinnaker)
One Kendall Square
Cambridge, MA 02139
(617) 494-1200
$49.95

Reviewed by Gil Merciez

The time is the mid-21st century. A devastating war in America has recently ended. Books are illegal The ideas within their covers are deemed dangerous by the political powers.

You are Guy Montag, a former fireman. But the job of fireman has mutated over the years and now you are supposed to burn instead of extinguish—to set afire written pages and punish those who would protect outlawed books.

As Montag, you discovered the

beauty in books and have turned to help The Underground. Each member of The Underground has committed a complete book to memory and is the sole repository for that particular work.

This is the setting for **Fahrenheit 451**, a graphic/text adventure from Telarium which spans two disks. Your objective is to link up with Clarisse, the girl who introduced you to The Underground, and put a stop to the extinction of books. This adventure represents a sequel to Ray Bradbury's famed early '50s science-fiction novel.

The setting for Fahrenheit 451 is primarily the buildings along Fifth Avenue in New York City. Members of The Underground are everywhere. You communicate to them with your lighter and various literary quotes. In return they pass along information to aid in your quest. As the game lacks a scripting feature, note-taking is essential for recording the quotes you hear.

Beware of the firemen and their mechanical hounds. Check your ID and don't lose track of time. Don't overlook the phone booths and the subway.

Three graphics areas use the upper third of the screen with the rest devoted to text. These three areas are sometimes combined to form larger pictures. While colorful and cartoonlike, they generally lack definition due to the small screen area being used. Having seen them a few times, I found game play was speeded considerably by switching to an all-text mode.

There is a lot of disk access in this adventure and the program supports two disk drives to reduce disk swapping. Up to 10 positions can be saved on a separate disk. Music and sound effects are sprinkled throughout the game, but the program uses none of the special features of the ST and appears to be a straight port from 8-bit systems.

The parser, while adequate, is far from state-of-the-art. A word list is included in the excellent documentation along with 25 coded hints, but some of the stock responses seemed out of place for particular requests. I certainly didn't expect a "Nothing happened" response when examining objects. Also, every time you die, you are told this fact twice.

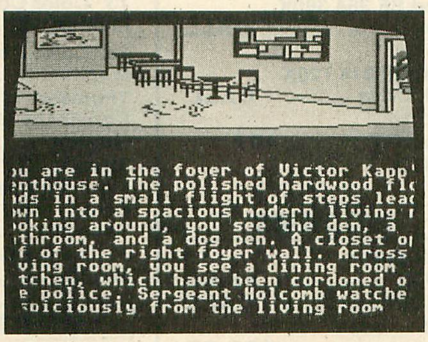
The text and storyline are the strong features of Fahrenheit 451. Gripping prose combined with the unique approach of obtaining and using literary quotations save this adventure from mediocrity. As opposed to many graphic adventures, descriptions in Fahrenheit 451 are rich in both style and content. I found myself drawn into the story, trying to fit all of the pieces together.

Thanks to liberal hints and suggestions from The Underground, I never reached a point of total frustration.

Despite a few drawbacks, primarily in ST implementation, Fahrenheit 451 is an absorbing addition to an adventurer's collection.

PERRY MASON
Telarium Corp.
(Spinnaker Software)
One Kendall Square
Cambridge, MA 02139
(617) 494-1224
$49.95

Reviewed by Brad Kershaw



Perry Mason: The Case of the Mandarin Murder is the first text/graphics mystery game to use Erle Stanley Gardner's famed fictional criminal lawyer. It is also a major breakthrough in interactive fiction—the cooperation of the characters, witnesses and jury changes as a direct result of your interactions with them.

Naturally, the program casts you in the role of Perry Mason. As in the long-running TV series, you must be able to analyze the evidence and put on a "performance" to extract information and confessions from witnesses or persuade the jury. But, Perry Mason cannot be expected to do the job alone, so Della Street and Paul Drake are there to help. Della summarizes testimony and feeds you helpful questions for cross-examination. Paul will investigate anything you wish.

You begin with a beautiful (of course) young woman entering your office late one night, saying her husband wants a divorce. Twelve hours later the husband is found dead and she is in jail as the prime suspect. You must dig into the private lives of the victim's friends and enemies, trying to find the real murderer. Was it the business partner who hated him, the mistress who was going to be dumped, or the magazine critic who lost his job. They all had motives. And being the great Perry Mason, you don't just want to get your client acquitted—you want to make the real murderer confess in the witness stand.

First you visit the scene of the crime and try to find evidence. Then you're off to the courtroom and the trial begins. There is extensive strategy for a successful defense. DA Hamilton Burger tends to push witnesses, so you must learn to object effectively.

The documentation which accompanies this game is very good, almost a complete tutorial for the novice lawyer. It explains fully the various types of objections you can use, and then gives you a mock bar exam to test your knowledge.

Learning to cross-examine a witness is very important for solving the case, and very tricky. You want the truth, but only that part which will not hurt your case. The documentation is full of hints for a successful trial.

The key part of this program is the ability to talk to each character. What you say and how you say it effects how the witness will respond to a question—most people have something to hide. The program also allows for some courtroom theatrics. When asking an important question, you could sneer first, or change your facial expression. This can also score points with the jury and frustrate the District Attorney.

continued on page 85

The Perry Mason game does not make use of the full capabilities of the 520ST. The graphics screens of the courtroom, office and characters consist of flat pictures. There are no drop-down menus or windowed instructions. All commands are relayed to the computer via the keyboard, instead of the mouse. At least the program does make use of the sound capabilites of the ST—it opens with the theme from the TV series, using all 3 voices.

Vocabulary is the major problem with the program. Questions that the TV Perry Mason would ask are sometimes not accepted. The witness does not understand some key points. The program comes with a "menu" of approximately 500 acceptable words, but they must be phrased in context exactly right or the question is not understood. This can become quite annoying.

Because of the vocabulary problems, the games tends to drag a little. But even when things are slow, you can use the time to ponder evidence or to send Paul Drake on an investigation. If you are a big Perry Mason fan like me, this is your chance to solve a major whodunit.

ELECTRO CALENDAR
$39.95
ELECTRO SOLITAIRE & 21
$19.95
Softlogik Corp.
4129 Old Baumgartner
St. Louis, MO 63129

Reviewed by Sol Guber

To show off the power and graphics of the Atari 520ST, good solid programs are needed. These two entries from a software company in St. Louis show a great deal of promise, but the final efforts leave much to be desired. I would give them a B+ for execution, B+ for design, and C- for concept.

Electro Calendar is an organizational tool to remind you of important dates and things to do. You enter a message into a date on a calendar and see the message anytime. For anniversaries or birthdays, you can add the message so that it gets repeated automatically each year.

You can scan the calendar for messages by day, month or year and you can print out either the calendar or the message. Messages may be edited and exported to other programs. You can also print out the monthly calendar.

Although this version of Electro Calender is a straight .PRG file, you may exchange it for a desk accessory version—when it becomes available—by sending in your registration card. This future enhancement will enable the calendar to reside in memory while another program is operating, but only if both programs use the GEM desktop.

Electro Solitaire and **Blackjack** are computer versions of the familiar card games. Both games are completely mouse-controlled. In blackjack, you play against the computer using Las Vegas rules. The solitaire is the classic "Klondike" and it has a bug. When you have an empty column in the field, the only card that can be transferred to that column—according to the rules—should be a king. This version allows any card to be put in that spot.

For me, these programs have a fundamental flaw. I don't think card games translate well into computer simulation. First of all, there is no real guarantee that the software will not cheat. It takes the same kind of trust to play blackjack against a computer as it does to listen to a ventriloquist on the radio. Also the computer cannot provide me with the tactile pleasure of handling the cards, although mouse-controlled cards are certainly superior to joystick or keyboard card games such as those which appeared for the 8-bit Atari models.

However, the graphics are clean and crisp and the speed is adequate. In fact, there is nothing really wrong with either of these card games—but there is also not much really right. Essentially, they make good demonstrations that will probably seldom be played after the novelty quickly wears off.

And this brings us back to the Electro Calendar. It also is a well executed program. The graphics are good and the program is user friendly. Ultimately, however, I do not feel this program will really be used. It is just as easy—if not easier—to write down notes on a calendar as to boot your computer and enter the information in Electro Calendar.

Electro Calendar is, no doubt, supposed to be similar to Sidekick for the IBM, but I don't feel any of its features are really worth the money. The program is more trouble than it is worth, since you need to load it each time you want to check out what is on your calendar. And with the present TOS, you have to set the date every time you start up the system. A real-time clock is needed to make this program practical and convenient. Overall, I feel Electro Calendar is a poor idea that was well executed.

Softlogik shows much promise. They obviously have learned all the fundamentals of programming under the GEM system. Those who like computer card games will, no doubt, enjoy these mouse-driven versions. And the calendar is a nicely written utility, but I think it is of limited practical value.

TYPESETTER ST
XLent Software
P.O. Box 5228, Dept. A
Springfield, VA 22150
(703) 644-8881
$39.95

Reviewed by Sue Bergstrand

Typesetter ST from XLent Software is an interesting printer utility that lets you design and print a full-page image of mixed graphics and text in assorted sizes and fonts.

The current release works with Epson-compatible or Prowriter-compatible printers. Its authors, Len Dorfman and Dennis Young, got their start in printer utilities with the Page Designer, Typesetter, and Rubber Stamp programs that run on the 8-bit Atari computers. But this Typesetter bears little resemblance to its 8-bit older brother.

The 8-bit Typesetter program is based on a text-character mode, in which you scroll around the full Typesetter page, with a little sketchpad window for adding pieces of graphics

continued on next page

or touching up characters. The ST version, on the other hand, is based on a graphics mode—with an option to switch to the text editor mode. Also, instead of scrolling, the program flips through a set of stationary overlapping cells.

This graphics mode dominance feels strange, because Typesetter ST is very limited as a *drawing* tool. "Klunky" would be a reasonable description of its graphics mode. And in fact, the Typesetter ST documentation recommends that you buy Tom Hudson's DEGAS program from Batteries Included to draw the graphics for loading into your Typesetter page. I certainly agree. I liked Typesetter ST much better after I stopped trying to draw with it.

Of course, both DEGAS and Neochrome allow you to add text to pictures and dump your pictures to the printer, but Typesetter ST will give you more flexibility in this area.

You can have only one full graphics screen in the Typesetter page, but depending on the cell into which you load it, you may add text in borders outside the picture at top and bottom, (medium or high resolution) and beyond the sides (high resolution only).

Typesetter ST can also save and load 8K "icon" segments of the page for more flexibility in placement and size of graphics. Like its older brother, Typesetter ST can print graphics fonts sideways and upside-down, as well as in a wide range of heights and widths. It can also use the ST's built-in font variations (thickness, outline, skewed, and underlined). But these work only on the ST's normal font, which does not offer the size variations.

One possible business or academic use of the larger sizes in the graphics fonts is for preparing copy for overhead transparencies. These large letters are much easier to read than the large typewriter fonts often used, and, of course, the ability to add graphics is there as well.

There are actually two Typesetter ST programs, one for the monochrome monitor and one for medium resolution on the color monitor. I have both monitors, but found I preferred working with the monochrome version, because the final, hardcopy output of the program is, after all, limited to black and white. Also, the higher-resolution monitor produces a higher-resolution printout.

The color version lets you draw in four colors. But for developing printer art, working with only the black and white is probably best. If you are adding some special Typesetter text to a picture done with a graphics package, and you plan to save the picture back to a 32K file for use with a slide show program, then being able to use the other two colors is an asset. The disk also includes utility programs to convert pictures between modes.

Be forewarned: Typesetter ST reserves about 150K for buffers. Unless you have already installed the TOS ROM chips or have a megabyte of memory, you will have to boot from a TOS disk with desk accessories removed—or you won't be able to load the program at all.

Also, check the disk for an update file called READ.ME. The documentation on my version of Typesetter was printed before the Disk I/O menu was rewritten. It mentions a font file called DEFAULT.FNT being loaded with the program. Actually, you can select "Load external font" from the revamped Disk I/O function key menu in the text editor.

A companion package to Typesetter ST, Rubber Stamp ST, is expected to be available by the time your read this. It will allow you to move icons around the screen in smaller increments than with the current product. You should also be able to shrink full-screen pictures to the "icon" size so that several complete pictures can be put on a page.

In all, if you have an interest in designing with text, with or without previously prepared graphics, you'll find Typesetter ST a useful package.

New Products

At this writing, **Antic** just returned from the Consumer Electronics Show in Las Vegas where Atari's focus was primarily on the mass market and the 8-bit machine. Most ST products had already been premiered at COMDEX, six weeks earlier. But there were some significant ST newcomers.

Two show-stealers illustrated the broad spectrum of ST software that is beginning to appear. One was a vertical-market-oriented PC board designer and the other was a spectacular graphics/adventure game called **The Pawn**.

The Pawn demonstrated the most advanced parser yet seen on a personal computer. Created by Magnetic Scrolls and distributed by Firebird, Inc., the program includes such advanced features as a 512-color title screen and a 16-color, low resolution screen, plus smooth scrolling over an 80-column, medium resolution screen. Watch future issues of **ST Resource** for more on this fantastic program.

Firebird, Inc., P.O. Box 49, Ramsey, NJ 07446. (201) 934-7373. DEMO.

Abacus Software, publishers of the recent line of ST books (see review in this issue) demonstrated an as yet untitled German program that will automatically design PC boards. Abacus expects to target the PC board designer at an industrial market and was showing it at consumer-oriented CES primarily because they had just received it and wanted to show it off. Nevertheless, within two days they received three dozen orders.

Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510. (616) 241-5510. DEMO.

Activision demonstrated, from a luxurious hotel suite, the remarkable **Music Studio** by Audio Light, Inc. This is sure to generate a lot of interest. The program will drive the ST sound chip, but it really takes off when a synthesizer is hooked up to your ST through the MIDI port. Last Christmas, **Antic** was treated to a demonstration of this product. We then uploaded fifteen demo files to DL6 of the 16-bit li-

brary of CompuServe's SIG*Atari. (They should still be there, along with instructions.) Music Studio is expected to be available by the time you read this. No price had been set at press time. Also, **Borrowed Time** ($44.95), which we had not received last month, is now in our hands. Expect a review soon.

Activision, Inc. 2350 Bayshore Frontage Road, Mountain View, CA 94043. (415) 960-0410. BETA/FINAL.

From Sierra On-Line, we can look forward to **The Black Cauldron** ($24.95), which was demonstrated at CES along with **Donald Duck's Vacation** ($24.95). The Black Cauldron, based on the Disney film, is similar in style to King's Quest II. In a more practical vein, Sierra will be releasing an accounting series beginning with **ST OneWrite** ($149.95), due in April.

Sierra On-Line, Coarsegold, CA 93614. (209) 683-6858. DEMO/PRESS/PRESS.

Alternate Realities is being developed for the ST by Datasoft. The programmers have been working on it since November and hope to have the finished product on the shelves by next Christmas. Philip Price, the game's original author, is serving as Creative Consultant, but will not be actively involved in the programming. No price has yet been set.

Datasoft, 19808 Nordhoff Place, Chatsworth, CA 91311. (818) 701-5161. PRESS.

Compute! Publications has released its first book for the ST, **The ST Programmer's Guide** ($16.95). Designed primarily for BASIC and LOGO programmers, the 365-page book includes introductions to ST BASIC and an explanation of the ST BASIC keywords. There is also a helpful section on LOGO primitives and concepts.

Compute! Publications, P.O. Box 5406, Greensboro, NC 27403. (919) 275-9809. FINAL.

Microprose will be releasing **Silent Service** (No price at press time). The ST version is being programmed by Silas Warner, who created Castle Wolfenstein on the 8-bit machines.

Microprose Software, 120 Lakefront Drive, Hunt Valley, MD 21030. (301) 667-1151. DEMO.

At the CES Casio exhibit, a company called Q.R.S. was demonstrating a novel MIDI product for the ST called **Q.R.S. Music Rolls** ($19.95). Each disk contains MIDI files of songs which have been directly translated from old player piano rolls. You can actually have George Gershwin play Rhapsody in Blue through your synthesizer. Nice idea.

Micro-W Distributing, 1342B Route 23, Butler, NJ 07405. (201) 838-9027. FINAL.

Also, for the MIDI, Hybrid Arts—creators of MIDITRACK II for the 8-bit Atari—will be releasing **DX-Droid** and **MIDI Track ST** (price not yet available). DX-Droid is a sophisticated patch librarian/editor for a Yamaha DX-7 synthesizer. MIDITRACK ST is the ST version of their 8-bit product. It will be available in both "professional" and "consumer" versions.

Hybrid Arts, Inc., 11920 W. Olympic Boulevard, Los Angeles, CA 90064. (213) 826-3777. PRESS.

Leaving CES and returning to the **ST Resource** offices, we have recently received **DevPacST** ($79.95), an assembler/editor/debugger, from a British software firm called Hisoft. At this time, no U.S. distributor has been announced. Contact the company directly at the below address.

Hisoft, 180 High Street North, Dunstable, Beds, England LU6 1AT. (0582) 696421. FINAL.

Zoomracks ($79.95) is a database system based on an entirely new computer interface metaphor. If you are familiar with the kind of view racks that are used for time cards, then you should have no problem adapting to Zoomracks. More than a database, really, the system is more of an organizer with integrated database and word processing abilities. This looks to be an interesting product. Watch for a review in the **ST Resource** soon.

QuickView Systems, 146 Main Street, Suite 404, Los Altos, California 94022. (415) 965-0327. FINAL.

Another unusual product is **Rhythm** ($39.95). This is one of the first third-party desk accessories for the ST. Rhythm is a multiple calculator in the form of a mini-spreadsheet. Developed in England by Softechnics, it is being distributed in this country by Apex Resources.

Apex Resources, 17 St. Mary's Court, Brookline, MA 12146. (617) 232-9686. FINAL.

Artworx has announced their commitment to the ST by adapting **Bridge 4.0** ($29.95) to the new machine. The ST version of Bridge 4.0 will be completely mouse-controlled. According to Artworx, "the user never has to touch the keyboard." The company also plans to release **CompuBridge** ($29.95), a tutorial program. CompuBridge will be written entirely in ST BASIC and the source code will be available to the user for programming examples.

Artworx, 150 North Main Street, Fairport, NY 14450. (716) 425-2833. PRESS.

And speaking of 8-bit translations, Epyx will be adapting the classic **Apshai Trilogy** to the ST, along with **Winter Games**. Both products are expected to be available by the time you read this. At press time, the retail price had not been set. Says Epyx vice president for marketing, Robert Botch, "We want owners of these new systems to be able to enjoy the same challenging Epyx games owners of other popular computers do."

Epyx, Inc., 1043 Kiel Court, Sunnyvale, CA 94089. (408) 745-0700. PRESS.

And. . .Oh, yes, did we mention that Atari was demonstrating **Star Raiders** for the ST at CES? No? Well, they were. The program is about one-third completed and it looked pretty good. There was a highly detailed control panel and solid-model—rather than wire-frame—ships.

*New ST product notices are compiled from information provided by the products' manufacturers. **Antic** assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time, **Antic** had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.*

ST BASIC VDI CALLS

Part II: Text & Graphics

by JAMES LUCZAK

In this issue, we provide the concluding 520ST Text and Graphics VDI calls which were left out last month due to lack of space.

Control GEM With ST BASIC, in the April, 1986 **ST Resource**, explained how to access VDI (Virtual Device Interface) calls from ST BASIC. An included demonstration program showed how some of these VDI routines serve as building blocks for the GEM desktop functions. We also published the ST BASIC code for two groups of VDI functions—Polymarkers and Polylines.

This month we complete this feature with the ST BASIC access codes for VDI functions in the Text and Graphics groups.

At this writing, Abacus Software has just released its *GEM Programmers' Reference Guide* ($19.95) which lists and explains all AES as well as VDI functions. (See review of two other Abacus ST reference books in this issue.) Although the book is aimed at C and assembly language programmers, you can combine its value tables with the concepts from these **ST Resource** articles to access the GEM AES routines.

TEXT

INQUIRE TEXT ATTRIBUTES

BASIC CODE	DESCRIPTION
1 poke contrl,38	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,0	
4 vdisys(1)	
5 a=peek(intout)	Text Face
6 b=peek(intout+2)	Text Color Index (SEE COLOR INDEX)
7 c=peek(intout+4)	Angle of rotation of baseline
8 d=peek(inout+6)	Horizontal Alignment
9 e=peek(intout+8)	Vertical Alignment
10 f=peek(intout+10)	Writing Mode
11 g=peek(ptsout)	Character Width
12 h=peek(ptsout+2)	Character Height
13 i=peek(ptsout+4)	Character Cell Width
14 j=peek(ptsout+6)	Character Cell Height
15 vdisys(1)	

NOTE: You need only PEEK at the attributes that are of interest to you.

COLOR INDEX

COLOR INDEX	COLOR	PIXEL VALUE
0	White	0
1	Black	15
2	Red	1
3	Green	2
4	Blue	4
5	Cyan	6
6	Yellow	3
7	Magenta	5
8	Low White	7
9	Grey	8
10	Light Red	9
11	Light Green	10
12	Light Blue	12
13	Light Cyan	14
14	Light Yellow	11
15	Light Magenta	13

SET TEXT ALIGNMENT

BASIC CODE	DESCRIPTION
1 poke contrl,39	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,2	
4 poke intin,x	HORIZONTAL ALIGNMENT 0=Left Justified (DEFAULT) 1=Center Justified 2=Right Justified
5 poke intin+2,x	VERTICAL ALIGNMENT 0=Baseline (DEFAULT) 1=Half Line 2=Ascent Line 3=Bottom 4=Descent 5=Top
6 vdisys(1)	

NOTE: Text alignment affects the text within the CHARACTER CELL.

SET TEXT COLOR INDEX

BASIC CODE	DESCRIPTION
1 poke contrl,22	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Color Index (SEE COLOR INDEX)
5 vdisys(1)	

SET TEXT SPECIAL EFFECTS

BASIC CODE	DESCRIPTION
1 poke contrl,106	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Special Effects word
5 vdisys(1)	

The SPECIAL EFFECTS WORD is a 6 bit word. Below is the word breakdown.

BIT	FUNCTION	BIT=0	BIT=1	BINARY VALUE
0	THICKENED	Not Thickened	Thickened	1
1	INTENSITY	Normal	Light	2
2	SKEWED	Not Skewed	Skewed	4
3	UNDERLINED	Not Underlined	Underlined	8
4	OUTLINED	Not Outlined	Outlined	16
5	SHADOW	Not Shadowed	Shadowed	32

EXAMPLE: To have THICKENED text give X in LINE 4 a value of 1. To have UNDERLINED and SKEWED text give X a value of 12.

SET CHARACTER HEIGHT ABSOLUTE MODE

BASIC CODE	DESCRIPTION
1 poke contrl,12	OPCODE
2 poke contrl+2,1	
3 poke contrl+6,0	
4 poke ptsin,0	
5 poke ptsin+2,x	X=Character Height in vertical units.
6 vdisys(1)	

NOTE: In the ABSOLUTE mode, the text HEIGHT is the distance from the BASELINE to the top of the CHARACTER CELL. (SEE POINTS MODE).

SET CHARACTER HEIGHT POINTS MODE

BASIC CODE	DESCRIPTION
1 poke contrl,107	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X= Character Cell Height in vertical units
5 vdisys(1)	

NOTE: In the POINTS mode, the character cell HEIGHT is the distance between the BASELINE of one line of text and the BASELINE of the next line of text, which is the character cell height.

SET CHARACTER BASELINE VECTOR

BASIC CODE	DESCRIPTION
1 poke contrl,13	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Angle of Baseline
5 vdisys(1)	

ANGLE OF BASELINE	DESCRIPTION
0	Text will start on LEFT of screen and go to the RIGHT.
900	Text will start at the BOTTOM of the screen and go to the TOP.
1800	Text will start at the RIGHT of the screen and go to the LEFT (UPSIDE DOWN)
2700	Text will start at the TOP of the screen and go to the BOTTOM.

NOTE: The ANGLE OF BASELINE is expressed in tenths of a degree. Examples of valid values are listed below.

SET WRITING MODE

BASIC CODE	DESCRIPTION
1 poke contrl,32	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Writing Mode 1=Replace 2=Transparent 3=Xor 4=Reverse Transparent
5 vdisys(1)	

GRAPHICS

ARC

BASIC CODE	DESCRIPTION
1 poke contrl,11	OPCODE
2 poke contrl+2,4	
3 poke contrl+6,2	
4 poke contrl+10,2	PRIMITIVE ID
5 poke intin,x	X=Start Angle
6 poke intin+2,y	Y=End Angle
7 poke ptsin,x	X=Coordinate of center point of ARC
8 poke ptsin+2,y	Y=Coordinate of center point of ARC
9 poke ptsin+4,0	
10 poke ptsin+6,0	
11 poke ptsin+8,0	
12 poke ptsin+10,0	
13 poke ptsin+12,x	X=Radius in horizontal units
14 poke ptsin+14,0	
15 vdisys(1)	

ATTRIBUTES:

Color
Line Type
Line Width
Writing Mode
End Style

NOTE: Angles are expressed in TENTHS OF DEGREES. (0—3600)

BAR

BASIC CODE	DESCRIPTION
1 poke contrl,11	OPCODE
2 poke contrl+2,2	
3 poke contrl+6,0	
4 poke contrl+10,1	PRIMITIVE ID
5 poke ptsin,x	X=Coordinate of corner of BAR
6 poke ptsin+2,y	Y=Coordinate of corner of BAR
7 poke ptsin+4,x1	X1=Coordinate of corner diagonally opposite coordinate X
8 poke ptsin+6,y1	Y1=Coordinate of corner diagonally opposite coordinate Y
9 vdisys(1)	

ATTRIBUTES:

Interior Style
Style Index
Writing Mode
Fill Color
Perimeter Style

CIRCLE

BASIC CODE	DESCRIPTION
1 poke contrl,11	OPCODE
2 poke contrl+2,3	
3 poke contrl+6,0	
4 poke contrl+10,4	PRIMITIVE ID
5 poke ptsin,x	X=Coordinate of center point of CIRCLE
6 poke ptsin+2,y	Y=Coordinate of center point of CIRCLE
7 poke ptsin+4,0	
8 poke ptsin+6,0	
9 poke ptsin+8,r	R=Radius in horizontal units
10 poke ptsin+10,0	
11 vdisys(1)	

ATTRIBUTES:

Interior Style
Style Index
Writing Mode
Fill Color
Perimeter Style

CONTOUR FILL

BASIC CODE	DESCRIPTION
1 poke contrl,103	OPCODE
2 poke contrl+2,1	
3 poke contrl+6,1	
4 poke intin,c	C=Color Index that defines the contour
5 poke ptsin,x	X=Coordinate of starting point
6 poke ptsin+2,y	Y=Coordinate of starting point
7 vdisys(1)	

CONTOUR FILL fills an area until it finds the edges of the display or the color index given in LINE 4. If the index given in LINE 4 is negative, the function searches for any color other then the color of the seed point. CONTOUR FILL is sometimes refered to as a FLOOD FILL or SEED FILL.

ATTRIBUTES:

Interior Style
Style Index
Writing Mode
Fill Color

ELLIPTICAL ARC AND ELLIPTICAL PIE SLICE

BASIC CODE	DESCRIPTION
1 poke contrl,11	OPCODE
2 poke contrl+2,2	
3 poke contrl+6,2	
4 poke contrl+10,i	PRIMITIVE ID 6=Elliptical ARC 7=Elliptical PIE SLICE
5 poke intin,a	A=Start Angle
6 poke intin+2,a1	A1=End Angle
7 poke ptsin,x	X=Coordinate of center point
8 poke ptsin+2,y	Y=Coordinate of center point
9 poke ptsin+4,xr	XR=Radius of X-AXIS
10 poke ptsin+6,yr	YR=Radius of Y-AXIS
11 vdisys(1)	

ATTRIBUTES:	Elliptical Arc	Elliptical Pie Slice
	Color	Color
	Line Type	Interior Style
	Line Width	Style Index
	Writing Mode	Writing Mode
	End Style	Perimeter Style

NOTE: Angles are expressed in TENTHS OF DEGREES (0-3600). Start angle to end angle is expressed in a COUNTERCLOCKWISE DIRECTION.

ELLIPSE

BASIC CODE	DESCRIPTION
1 poke contrl,11	OPCODE
2 poke contrl+2,2	
3 poke contrl+6,0	
4 poke contrl+10,5	PRIMITIVE ID
5 poke ptsin,x	X=Coordinate of center point of ELLIPSE
6 poke ptsin+2,y	Y=Coordinate of center point of ELLIPSE
7 poke ptsin+4,xr	XR=Radius of X-AXIS
8 poke ptsin+6,yr	YR=Radius of Y-AXIS

ATTRIBUTES:

Color
Interior Style
Style Index
Writing Mode
Perimeter Style

FILL AREA

BASIC CODE	DESCRIPTION
1 poke contrl,9	OPCODE
2 poke contrl+2,num	NUM=Number of X & Y pairs in the polygon.
3 poke contrl+6,0	
4 poke ptsin,x	X=Coordinate of first point of polygon.
5 poke ptsin+2,y	Y=Coordinate of first point of polygon.
6 poke ptsin+4,x1	X1=Coordinate of second point of polygon.
7 poke ptsin+6,y1	Y1=Coordinate of second point of polygon.
8 vdisys(1)	

The FILL AREA function will fill a complex polygon. The polygon to be filled is specified in LINES 4 thru 7. This function is the same as the POLYLINE function, except that it will fill the specified polygon. (See POLYLINE)

ATTRIBUTES:

Color
Interior Style
Style Index
Writing Mode

NOTE: See EXTENDED INQUIRE for maximum number of lines in POLYGON.

GET PIXEL VALUE

BASIC CODE	DESCRIPTION
1 poke contrl,105	OPCODE
2 poke contrl+2,1	
3 poke contrl+6,0	
4 poke ptsin,x	X=Coordinate of PIXEL
5 poke ptsin+2,y	Y=Coordinate of PIXEL
6 vdisys(1)	
7 a=peek(intout)	Pixel Value
8 b=peek(intout+2)	Color Index
9 vdisys(1)	

NOTE: See COLOR INDEX for Pixel Value, and Color Index information.

ROUNDED RECTANGLE AND FILLED ROUNDED RECTANGLE

BASIC CODE	DESCRIPTION
1 poke contrl,11	OPCODE
2 poke contrl+2,2	
3 poke contrl+6,0	
4 poke contrl+10,x	PRIMITIVE ID 8=Rounded Rectangle 9=Filled Rounded Rectangle
5 poke ptsin,x	X=Coordinate of lower left corner of RECTANGLE
6 poke ptsin+2,y	Y=Coordinate of lower left corner of RECTANGLE
7 poke ptsin+4,x1	X1=Coordinate of upper right corner of RECTANGLE
8 poke ptsin+6,y1	Y1=Coordinate of upper right corner of RECTANGLE
9 vdisys(1)	

continued on page 94

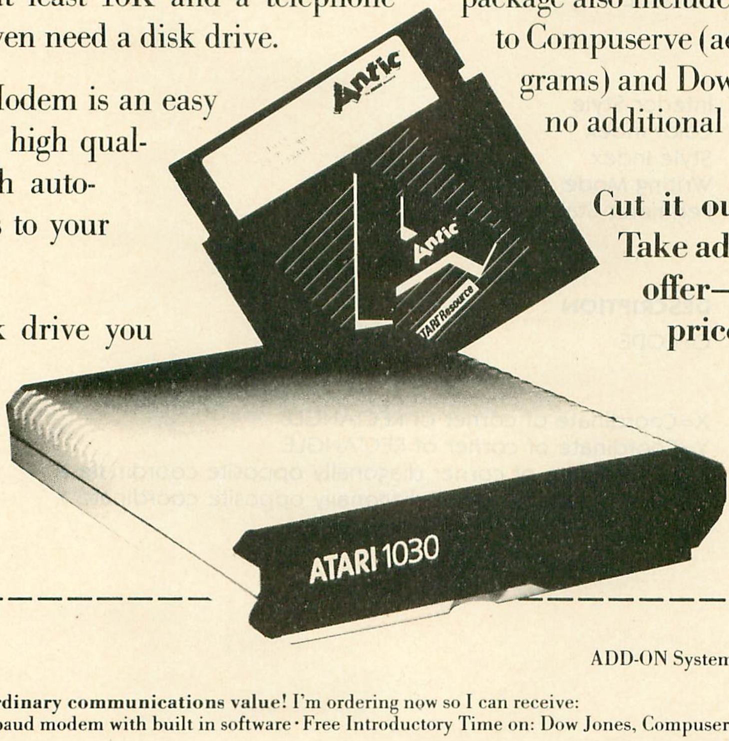
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California residents add 6½% sales tax.
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Canadian residents please send U.S. dollars.
Allow 2-4 weeks for delivery.
Prices subject to change without notice.
Delivery subject to availability.

VDI CALLS
continued from page 92

ATTRIBUTES:	Rounded Rectangle	Filled Rounded Rectangle
	Color	Color
	Line Type	Interior Style
	Line Width	Style Index
	Writing Mode	Writing Mode
		Perimeter Style
		Line Width

INQUIRE COLOR REPRESENTATION

BASIC CODE	DESCRIPTION
1 poke contrl,26	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,2	
4 poke intin,x	X=Requested Color Index 0-15 Low 0-3 Medium
5 poke intin+2,1	
6 vdisys(1)	
7 a=peek(intout)	Color Index
8 b=peek(intout+2)	RED Intensity
9 c=peek(intout+4)	GREEN Intensity
10 d=peek(intout+6)	BLUE Intensity
11 vdisys(1)	

NOTE: Intensities are expressed in TENTHS OF PERCENT (0-1000).

INQUIRE CURRENT FILL AREA ATTRIBUTES

BASIC CODE	DESCRIPTION
1 poke contrl,37	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,0	
4 vdisys(1)	
5 a=peek(intout)	Interior Style
6 b=peek(intout+2)	Color Index
7 c=peek(intout+4)	Style Index
8 d=peek(intout+6)	Writing Mode
9 e=peek(intout+8)	Perimeter Status
10 vdisys(1)	

FILL RECTANGLE

BASIC CODE	DESCRIPTION
1 poke contrl,114	OPCODE
2 poke contrl+2,2	
3 poke contrl+6,0	
4 poke ptsin,x	X=Coordinate of corner of RECTANGLE
5 poke ptsin+2,y	Y=Coordinate of corner of RECTANGLE
6 poke ptsin+4,x1	X1=Coordinate of corner diagonally opposite coordinate X
7 poke ptsin+6,y1	Y1=Coordinate of corner diagonally opposite coordinate Y
8 vdisys(1)	

ATTRIBUTES:

Color
Interior Style
Style Index
Writing Mode

SET COLOR REPRESENTATION

BASIC CODE	DESCRIPTION
1 poke contrl,14	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,4	
4 poke intin,x	X=Color Index
5 poke intin+2,r	R=RED Intensity
6 poke intin+4,g	G=GREEN Intensity
7 poke intin+6,b	B=BLUE Intensity
8 vdisys(1)	

NOTE: Intensities are expressed in TENTHS OF PERCENT (0-1000).

SET FILL COLOR INDEX

BASIC CODE	DESCRIPTION
1 poke contrl,25	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Color Index (See COLOR INDEX)
5 vdisys(1)	

SET FILL PERIMETER VISIBILITY

BASIC CODE	DESCRIPTION
1 poke contrl,104	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Visibility Flag 0=Invisible NON-ZERO=Visible
5 vdisys(1)	

This function allows you to turn the outline of a filled area on or off. The border of a fill area is drawn with a solid line with the current fill area color. When Visibility is OFF no border is drawn. DEFAULT is Visibility ON.

SET FILL INTERIOR STYLE

BASIC CODE	DESCRIPTION
1 poke contrl,23	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Fill Interior Style 0=Hollow 1=Solid 2=Pattern 3=Hatch 4=User defined
5 vdisys(1)	

SET FILL STYLE INDEX

BASICCODE	DESCRIPTION
1 poke contrl,24	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,x	X=Fill Style Index for Pattern or Hatch Interior
5 vdisys(1)	

NOTE: There are 24 Styles for Pattern and 12 Styles for Hatch. See ST BASIC SOURCEBOOK for descriptions.

EXTENDED INQUIRE

BASIC CODE	DESCRIPTION
1 poke contrl,102	OPCODE
2 poke contrl+2,0	
3 poke contrl+6,1	
4 poke intin,1	Extended Inquire Values
5 vdisys(1)	
6 a=peek(intout+2)	A=Number of Background colors in color palette
7 b=peek(intout+4)	B=Text Effects Supported
8 c=peek(intout+14)	C=Contour Fill Capability
9 d=peek(intout+16)	D=Character Rotation Ability 0=None 1=90 Degree increments only 2=Arbitrary angles
10 e=peek(intout+18)	E=Number of writing modes available
11 f=peek(intout+22)	F=Text alignment capability 0=No 1=Yes
12 g=peek(intout+28)	G=Maximum number of polylines,polymarkers.
13 vdisys(1)	

NOTE: You need only PEEK at the attributes that are of interest to you.

ROCKSLIDE

by JAMES HAGUE

Superior sound, speed and strategy set apart this joystick-controlled strategic arcade game for one or two players. The BASIC listing works on all 8-bit Atari computers with 16K cassette or 24K disk.

Quick! Fire at that banana! Watch out for that flying fire hydrant! Rats! You just got rammed by a salami!

Sound familiar? Yes, another one of those games that require the mentality of an ice cube. "Isn't there an arcade-style game for someone who has more than rocks upstairs?" you ask. Yes, there is—Rockslide by James Hague. This strategic Pongo-type arcade experience requires both speed and smarts. And it's only available through this amazing offer! Just type in Listing 1, ROCKSLDE.BAS, check it with TYPO II and SAVE a copy before you RUN it.

ROCKBUSTERS

When you RUN the program, the words "ANTIC PRESENTS" will appear as the game loads. This is a good time to plug one or two joysticks into the Atari joystick ports. When the flashing purple, pink, orange and green title screen appears, press [SELECT] to choose either one or two players, press [OPTION] to choose between game boards one, two or three, and press [START] to get going. Each of the three boards requires its own style of play to complete. The first is large and roomy, the second is a standard maze, and the third is a rock crusher's delight.

You'll enter a land of blue or green rocky mazes and solid rock walls. Three rocks are flashing. These are valuable diamonds that you must line up so they touch each other in a horizontal or vertical row.

A sliding rock gathers no moss. Remember this. You gotta be smart—to size up the most strategic path through the maze of boulders without getting jammed in a corner. (Once you're jammed, you're stuck for good.) You gotta be strong—to bust any boulder that gets in your way. And you gotta move fast—to get those three diamonds lined up right next to each other in a horizontal or vertical row. So size up your options, warm up your brain cells, push the joystick button and get ready for a rocky race.

Player one's screen will come into view. Like it or not, you're a Rockbuster, that noisy orange creature lost in the middle of a blue or green rocky maze. To run the Rockbuster around the board, push the joystick. (You can't move diagonally.) Any rock or diamond can slide around the playing field. To accomplish this feat, position yourself alongside a rock, press the button first, then push the joystick in the desired direction. The rock will slide unless it is blocked by a rock behind it.

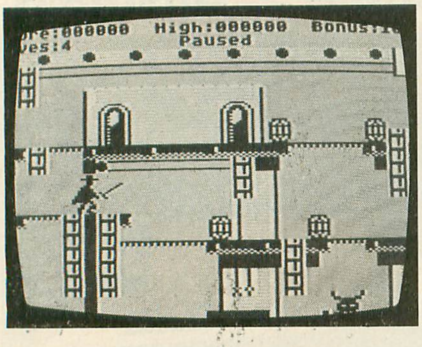
You can bust up a rock that won't slide by pressing the joystick button as you push against the rock. If you try to crush a diamond, however, your computer will razz you rudely. Sometimes you'll get stuck in a corner. If this happens, you have no choice but to press [START] to abort your turn and forefeit the game to your opponent.

When you finish, you'll hear an explosion and a status screen will appear comparing your score to your opponent's, or to your own best previous time. (By the way, my own fastest score is 8.11 seconds on board one.)

But hurry. Your opponent (if you have one) will plug a joystick into port 2 and press the button to start. And your opponent may be faster than you. Or smarter. When player two is done, you'll see another status screen and the computer will compare scores to determine a winner.

*James Hague is a Texan from out Richardson way and this is his first appearance in **Antic**.*

Listing on page 124



ZORRO

Datasoft/H.P. Software
19808 Nordhoff Place
Chatsworth, CA 91311
(818) 886-5922
$29.95, 48K disk

Reviewed by David Plotkin

Zorro is a graphic arcade/adventure featuring multiple screens, puzzle solving and arcade action. It is well implemented, but there's very little to distinguish it from other games of this type. Still, if your collection doesn't include a game like this, you may want to consider getting Zorro.

The familiar storyline has the beautiful senorita kidnapped by evil Sargeant Garcia, Zorro's traditional nemesis. Zorro must travel through 20 different screens to rescue her. In the course of his travels, the black-clad fighter for justice will have to use his trusty sword to defend himself against roving guards. Actually, Zorro seems to fight automatically. All you have to do is move the joystick back and forth and press the fire button at the right time to defeat the enemy.

The adventure portion of the game is better. Many parts of each screen are inaccessible unless you exit and reenter from another screen. You will also have to pick up keys to unlock doors, and recover items such as whiskey, money and a branding iron. You must figure out where and when to use these items to solve the screens. Some cleverly designed trampolines must be used to get to certain levels of each screen which cannot be reached any other way. The multiple-level screens contain ladders, trees you can climb on and chasms to leap across.

Zorro has its frustrations. The imprecise joystick control can cause you to miss jumps. You may have to traverse several screens before you can try the jump again. Missing a jump in one of the underground caverns is fatal and these screens are *very* unforgiving.

The graphics are reminiscent of another Datasoft game, Bruce Lee. In fact, the main problem with this game is that it is similar to so many others, but not as much fun to play. The arcade action is not very challenging and the screen puzzles will challenge only the novice.

TRAIN DISPATCHER

Signal Computer Consultants
P.O. Box 18222, Dept. 25
Pittsburgh, PA 15236
(412) 655-7727
$25, 16K disk or cassette

Reviewed by Jack Mindy

Looking for an arcade-style game, with heavy-duty graphics and plenty of shoot-'em-up action? This isn't it.

Looking for a game that keeps you hopping for half an hour and leaves you tired but happy? This *is* it.

Train Dispatcher has no "lives" for you to lose, no enemy except time, no collisions, explosions or other disasters. Just a bunch of trains that you dispatch along a 150-mile portion of a major railroad. In the course of your eight-hour shift, which takes about a half-hour of real time, you might have as many as a dozen trains pass through your territory.

All you have to do is set the mainline track switches and set the signal lights which give the engineer permission to proceed. Sounds easy, huh?

However, you'll also have to check the official schedule and make sure a train isn't blocking the single-track mainline when it stops for 30 minutes to change crews. And you'd better make sure you don't have a train in a section that has to be closed down by the maintenance-of-way boys. Hmmm, this isn't as easy as it looked. All the information is displayed on two schedule screens that can be called up at any time, but. . .

I'll admit that I'm a real train buff. Model railroading was my big hobby until I bought my Atari 800 four years ago. Since then, the L-shaped 20 × 20-foot model railroad I was building in the basement has become home to some insects, who haven't needed to worry about being run over by an HO scale locomotive. Nothing's run since the Atari moved in. So Train Dispatcher sounded like a good way for me to do some railroading without having to leave my computer desk.

The "game" itself is really no game, it's a simulation of just what a railroad dispatcher does for a living. He's a sort of landlocked air traffic controller. During the course of your half-hour shift there are very few moments when you can stop and catch your breath. And that's in the Visitor game. One can only imagine what the top level, Trainmaster, must be like. There's nothing like guiding a train from a double-track main into a single-track section, and finding the you've got another train headed onto the same track.

But Train Dispatcher is definitely not a game for someone who demands bells and whistles and graphics that make full use of the Atari's potential. The graphics are strictly business-like. But even though everything has a bare-bones feel, it really doesn't take anything away from the game. After all, this is like a simulation used to train railroad dispatchers. The main overview screen is patterned after a

real railroad's CTC (Central Traffic Control) panel. Just a line indicates each section of track. Sorry, there is no choo-choo running around the screen.

The one incongruity among all this serious professionalism is the chorus of "I've Been Working On The Railroad" which greets the would-be dispatcher after you type RUN "D:DISPATCHER." For some reason, the disk does not autoload. And, yes, the instructions tell the user to type the full word DISPATCHER, even though it's over the 8-character limit for a filename. The computer just ignores the two excess characters.

Train Dispatcher comes with a nicely-printed booklet to get you familiarized with operating procedures. The middle pages of the booklet list the loading instructions and keystroke commands for the brand of computer you're using. Also included is a template to place on your keyboard. This is a great help for the first few times you play.

Some computer games are very complicated but don't hold your interest for long. Others like Train Dispatcher look simple and almost dull, but keep you coming back for more. It takes a clear mind to keep the railroad running smoothly. Yet a youngster can play and feel the satisfaction of a measure of success without the negativity of being shot, exploded, or gobbled up.

According to the brochure included with Train Dispatcher, Signal Computer Consultants will be releasing a Super Dispatcher simulation, a Northeast Corridor simulation with Metroliners and all, a Locomotive Switcher simulation with high-resolution graphics—and their only non-railroad offering, an underwater Sonar Search simulation. All these forthcoming programs are scheduled for 1986 release on Apple, IBM and Commodore, but NOT for Atari. Is it time for **Antic** readers to start writing letters again?

VOICE MASTER

Covox, Inc.
675-D Conger Street
Eugene, OR 97402
(503) 342-1271
$89.95, 48K disk

Reviewed by Charles Cherry

The **Voice Master** is to sound what ComputerEyes is to pictures. It is a sound digitizer. The Voice Master grabs sounds and converts them into digital code which is stored in memory. Once in memory, the sounds can be manipulated in various interesting ways. Voice Master includes software for a unique music composer and surprisingly good speech recognition.

Demo programs include a talking alarm clock, a voice-recognizing calculator, and a blackjack game that talks and listens. These are fun, but their real value is in demonstrating the use of Voice Master in BASIC programs. It is very easy. The Voice Master gives you new BASIC keywords to access its features. This is great for Atari BASIC programmers, but it locks out those who use other languages, even BASIC XL/XE. I hope Covox will make another version of the software without the BASIC hooks.

Sound digitizing takes vast quantities of memory. Covox includes three different versions of the software to get the maximum out of 800, 800XL, and 130XE Atari models. They also provide three digitizing speeds so you can trade sound length for sound quality. At the medium speed (about 7,800 samples per second) the 130XE records around 9 seconds of sound and uses 64K.

The Voice Master is both software and hardware. There is a small box to plug into either joystick port 1 or 2 and a nice headset/microphone which allows hands-free talking to your computer. The package also includes the Voice Harp Composer, an interesting music program. Its features put it near most of the other commercial music software, but you can enter the music just by humming or whistling.

The Voice Master is not the first sound digitizer for the Atari, but it is the best I've seen. The record-playback quality is very decent, although not completely noise-free. The voice recognition routine (which is a first on the Atari) works very well. The Voice Master is a welcome addition to the Atari world. It has lots of possibilities.

CONFLICT IN VIETNAM

MicroProse Software
120 Lakefront Drive
Hunt Valley, MD 21030
(307) 667-1151
$39.95, 48K disk

Reviewed by Dr. John Stanoch

Ten years later, the war in Vietnam still stirs up mixed emotions in many Americans. **Conflict In Vietnam**, the newest wargame simulation in MicroProse's Command Series, is likely to stir up those intense emotions more turbulently. But by bridging the gap between a computer game and an efficient learning tool, the carefully researched Conflict in Vietnam marks a rare standard for entertainment software.

Because of the hidden guerilla-warfare capability of the Viet Cong forces, and the political-military implications contained in this historic conflict, this game demands strategy and tactics totally different from any other computer wargame you have ever played. Players are given the opportunity to analyze five important military actions which occurred in Vietnam from 1954 through 1972. These include the battle of Dien Bien

continued on page 103

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Phu, Ia Drang, Khe Sanh, Fish Hook (the Cambodia incursion) and finally, Quang Tri (the communist Easter Offensive in 1972).

This 0, 1 or 2 player game utilizes the highly playable "realtime" system seen in Microprose's **Crusade In Europe** and **Decision In The Desert**. Victory in each of the five scenarios depends upon the number of points each player receives for "casualties inflicted" and "geographic objectives captured." Each player has the option of controlling either the Free World or Communist forces. The Free World includes the French in Dien Bien Phu or the US and ARVN (South Vietnam) forces in the later scenarios. Communist forces include the Viet Minh in Dien Bien Phu and the NVA (North Vietnamese) and Viet Cong in the remaining scenarios. As in other Command Series games, balance of the forces can be adjusted prior to play and the game speed can be changed anytime.

Excellent graphics make it easy for players to identify the type of unit to which they are currently issuing orders. Well-executed icons portray communist infantry, mortar and artillery placement in all scenarios. In the Quang Tri scenario, Communist tank units are depicted as detailed renderings of T-55 tanks. The Free World forces are shown as infantry, armored cavalry, artillery, fighter and bomber aircraft. Three types of helicopters include attack, recon and air mobile choppers. Each scenario is played on a scrolling map ranging in size from 1 1/2 by 1 screen, to 2 1/2 by 2 screens.

Since the game utilizes a realtime action system, unit responses occur continuously and almost simultaneously throughout the game. This speed helps in accurately simulating the kind of warfare waged in Vietnam, especially while playing the side of the US/ARVN. For example, during a game, I would locate a hidden Viet Cong unit with my recon helicopter and immediately order an intensive airstrike against it. However, many times the Viet Cong would slip away before the strike could be carried out. Although frustrating, it is historically correct.

I recommend this game to both wargamers and political history enthusiasts alike. With carefully researched documentation and historical notes, MicroProse's Sid Bever uses a computer wargame as a guided walk-through tour of history. Through "programmed text" documentation, the player chronologically develops a deeper understanding of the events during the 18 years of war covered by this game. After playing Conflict In Vietnam a number of times, I have a better understanding of what was really going on in Vietnam.

MOVIE MAKER

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 371-7171
$32.95, 48K disk

Reviewed by Michael Lasky

There's no denying that **Movie Maker** is one of the most powerful programs ever devised for the Atari. There is also no denying that MM is one of the trickiest to master. Once you have, though, this animation software is quite satisfying.

The program is ostensibly designed to walk you though the entire moviemaking process. What you need is a joystick, 48K, two drives preferably (you can squeak by with one) and lots of patience for the detailed work to follow.

Previously published by Reston, the Electronic Arts version of Movie Maker has been somewhat re-edited. It now contains over 100 more clipart pictures plus three demonstration movies by big-name cartoonist Gahan Wilson. Because there are so many logistics which must be comprehended, you, the director, must rely on the instruction book to lead the way. Although the documentation has been improved, it is *still* not always clear and demands multiple meticulous readings. But, remember, this is moviemaking and few films get their scenes perfect in one take.

The single overiding obstacle is coordination. MM comes with a disk's worth of predesigned actors, background sets, sounds and shapes for the user to manipulate. And while you can get as many as six actors on the screen at once, each one's movements must be recorded individually. The actors—everything from a dog and a dragon to a human family—have their own built-in movements which you control from the keyboard. Cross screen movement, however, is operated by the joystick. I thought I had a defective program or a broken joystick for the first three hours until I discovered that pressing the [RETURN] key toggles the joystick directions for lefties and righties.

In the four menu-selected sections of MM, you use single and occasionally multiple keys for different effects. But sometimes the same letters have different purposes. For example, in the Compose sequence, pressing [A] means [A]ction for previewing a sequence. In the Record sequence, however, it stands for [A]ctor and must be used with a number from one to six.

This often proved confusing, especially in the beginning. The program is so crammed with functions that I am still finding new ones I didn't know existed—like typing [S]ave during the final play of a movie. This will save a frame from your production for later printing on a color or b/w printer.

Up to 300 frames of animation can be created and edited at one time. You

continued on next page

can string a series of these "shots" on one disk for continued play and you can videotape them for continuous flow. There are 128 colors with four recordable color tracks and four tracks for sound effects. The sounds provided on the disk are limited and the ones on the original version are better than what Electronic Arts offers here. There is no capability for creating your own.

You can zoom at three different levels, fast forward, rewind, freeze frame and control the frame or flutter rate. Through trial and error you will find dozens of special effect combinations you can create with color and text. A special section gives you two complete screens for custom titles and credits which scroll handsomely on the screen before and after your masterpiece.

A help line located at the bottom of the screen is unfortunately so flush with the edge that if your TV or monitor suffers from overscanning, you will lose the line completely.

Another drawback is that with only one disk drive, you will be *constantly* juggling three disks—the program, the data, and your production. As I said, moviemaking requires patience and perseverance.

MM will not train you to be the next Walt Disney, but it can give you a taste of what making animated films is like. It is definitely time-consuming hard work, but when you see those credits flash across your screen it *is* worth it.

STAR FLEET I

Cygnus Software
P.O. Box 57825
Webster, TX 77598
(713) 486-4163
$49.95, 48K disk

Reviewed by Harvey Bernstein

Question: What combines the challenge of Star Raiders, the options of the best strategy games and the real-life progression of a fantasy role-playing game? Answer: **Star Fleet I** from Cygnus, a small software house in Texas.

Up to now, I was convinced that the best new games would be for the ST series only, and we XL/XE stalwarts would have to make do with periodic releases from Infocom. Star Fleet I is the best strategy/role playing game in a long time and should particularly appeal to fans of the old BASIC Star Trek games.

For those unfamiliar with the genre, I'll explain. The basic plot has you commanding a starship in one section of the galaxy, usually made up of sectors in a 3-D grid. On patrol against enemy ships, you warp back and forth, using phasers and torpedos to wipe out opponents, docking at star bases for necessary repairs and fuel. This is also the core of Star Fleet I—but with so many other options that I can just touch on a few.

Tactics—Not only can you destroy enemy ships, you can also do just enough damage to disable them. You can then grab them with your tractor beam for delivery to the nearest Star Base, which may add a commendation to your service record. Or you can beam a party of marines aboard a disabled ship and transfer all its energy to your reserves, along with enemy prisoners.

Surprises—Of course, enemy prisoners may escape. Or a spy may beam aboard during refueling. In that case, you have a whole system of internal security to access in order to prevent sabotage. There's nothing worse than having your phasers suddenly go out while battling four enemy ships. Just as in Star Raiders, rescuing bases becomes imperative at the higher levels. Put all this together with *two* enemy technologies—one of which uses invisible ships—and you have a great game.

Documentation—Normally I don't think about it, but the documentation for Star Fleet I sets a new standard for games of this type. The box comes with a 98-page Officer's Manual that walks you through all the commands and background. Registered owners can send for a free Star Fleet Training Manual which provides further instruction on battle tactics, effective maneuvering, and the like. My only complaint is that since most people will find *both* books invaluable, and the second is free anyway, Cygnus may as well package it with the game.

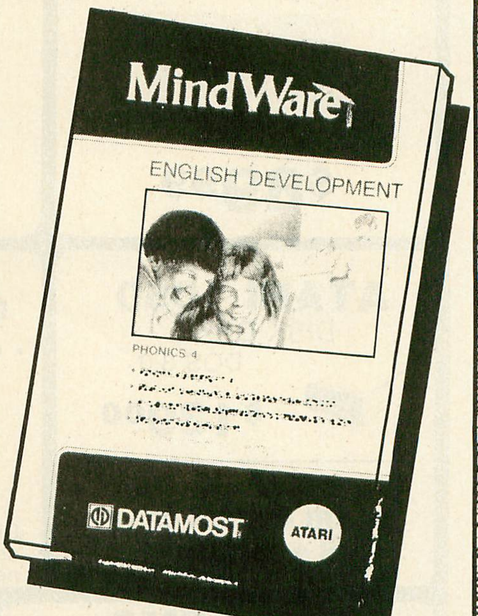
One more thing—the role-playing aspect. Each game starts you as a cadet in training. As you successfully complete more complex missions, you advance in rank and earn commendations—all of which are saved to disk. Therefore, you can't play at a level you have not been adequately prepared for—a nice touch!

As is typical with a game like this, the graphics are not outstanding. But they are functional with a minimum of animation. Yet Star Fleet I is so rich in and of itself that flashy graphics become almost superfluous. Star Fleet I is subtitled "The War Begins," which implies a sequel or sequels. Like many sequels, it will have a lot to live up to.

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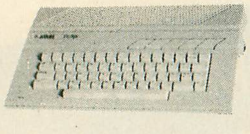
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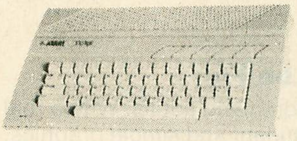
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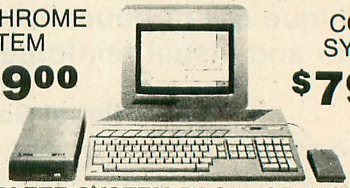


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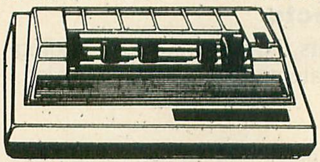
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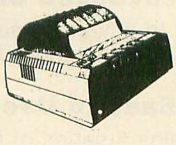
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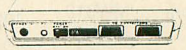
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Lesson 3: Variables, IF/THEN

by DAVID PLOTKIN

In the past two issues of **Antic**, we introduced programming on your 8-bit Atari computer in BASIC and covered some simple instructions to get you going. This month we'll start doing useful work and learn some important new programming commands, culminating in a type-in, computerized "Hangman" game.

VARIABLES

Before proceeding, it is important to understand the concept of a **variable**. Variables can be assigned different values during the running of a program. For example, you may see a statement like the following:

10 LET XXX=10.5

This statement assigns the *value* of 10.5 to the *variable* named XXX. LET is a BASIC command for assigning values to variables. It is optional, however, and may be left out as shown below:

10 XXX=10.5

This second version is also fine. XXX may very well be assigned a different value elsewhere in the program, and after this happens, it will *not* continue to be equal to 10.5. Instead, it will now equal whatever new value has been assigned to it. As an example, try the following short program:

10 XXX=0:REM set variable XXX equal to the value of 0.

20 XXX=XXX+1:PRINT XXX:REM change the value assigned to XXX.

30 IF XXX<10 THEN GOTO 20 Look at line 20. Something new is going on here. Line 20 is saying "variable XXX is being assigned the value equal to the current value of XXX plus 1." Thus, XXX will be equal to 1, then 2, then 3 and so forth. This illustrates two important principles about variables. The first is that a variable may be assigned a value which is calculated by the arithmetic operators. (These operators will be discussed in a future column.) Line 20 is quite simple, but the calculation can be as complex as you'd like:

20 XXX=4*(PP-2)/3*24

The above example is perfectly valid. A second principle is that other variables can be included in the equation, including the variable whose value is being reassigned. In BASIC, references to the variable which appear to the right of the equal sign refer to the *old* value of the variable. As an example:

10 XXX=5:XXX=XXX+XXX:REM now XXX is equal to 10, 5+5.

20 XXX=XXX+XXX:REM now XXX is equal to 20, 10+10.

Variable NAMES, like XXX in the above example, may be as long and descriptive as you desire. However, you'll want to use a variable name that gives a hint of the variables's purpose. For example, in the listing accompanying this column, you'll see variables such as *incorrect* and *correct*. It isn't too hard to figure out which one records the number of correct letters in your word!

You should not use BASIC commands for variable names (RUN, for example, is not a good variable name). Nor can you use variable names whose first letters correspond to a BASIC command. This is not as hard to do as you might think—variable names such as FORMLENGTH won't work because the first three letters are FOR, a BASIC command. Variable names must also start with a capital letter, and contain only letters and num-

continued on next page

bers. Except for these restrictions, however, variable names may be just about anything you like.

IF/THEN DECISIONS

During the course of a program you will frequently need to execute certain commands based on the specific conditions existing during that particular time. For example, you might want to execute one set of lines if a variable is equal to one value, but execute a different set of lines if the variable equals something else.

Atari BASIC has a powerful pair of commands which test for certain conditions and then execute the appropriate program statements based on the results of these tests. The two commands, IF and THEN, must be used together. This month's listing contains several examples using IF and THEN.

The **IF/THEN** command consists of two parts. The first part is called the *test* and the second part is called the *decision*. The test occurs right after the IF statement. The decision occurs right after the THEN statement:

10 IF (Test) THEN (Decision)

The test, logically enough, determines whether certain conditions have been met. The test can be as simple as whether two variables are equal:

IF XXX=YYY THEN. . .

The test can also be quite complex and involve calculations:

IF (XXX*2+3/4)=YYY/44 THEN. . .

Note that the * is the symbol for multiplication. All arithmetic and algebraic notation will be discussed in a future column.

The test can also determine whether several different conditions have been met. The keywords AND and OR will be discussed in a future column, but their use should be fairly intuitive. To test whether several different conditions are *all* true, use AND:

IF (XXX=4) AND (YYY=8) AND (ZZZ=2*YYY) THEN. . .

To test whether *one* of several conditions is true, use OR:

IF (XXX=4) OR (YYY=8) THEN. . .

You may also combine them:

IF (XXX=4 AND YYY=8) OR (ZZZ=10) THEN. . .

This statement will evaluate as true if both XXX=4 and YYY=8, *or* if ZZZ=10. If *all three* conditions are true, then the statement will also evaluate as true.

Once you have determined whether a condition is true, you must tell the program what to do about it. This is the decision. In the following example, the program will print "TRUE" if XXX=4:

IF XXX=4 THEN PRINT "TRUE"

In fact, a whole series of statements can be executed after the THEN command:

10 IF XXX=4 THEN PRINT "TRUE":PRINT "XXX=4": GOTO 100

It is important to remember that *none* of the statements following THEN will be executed if the test is false. New programmers often will forget this, sometimes with unanticipated results. If the test is false, the program ignores everything after THEN and drops down to the next line.

If the test is true, the program executes everything after THEN and then proceeds to the next line. One of the limitations is that if the statement is true, everything you want to do might not fit on one line. You will see an example of this in this month's listing. To avoid this problem, you will need to change your test, and use the decision to jump *around* the statements you want executed:

10 IF XX<>1 THEN GOTO 40:REM you want to execute lines 20 and 30 only if XX=1 (<> means unequal)

20 PRINT "Hello there, reader of New Owner's Column"

30 PRINT "You got here because XX=1!"

40 REM pick up here regardless of the value of XX.

You will get used to these programming methods as you practice your new skills.

FOR/NEXT/STEP

Often, in a BASIC program, you will want to execute a set of statements many times. For example, you may want to PRINT "Oh, hello there" on the screen 50 times. You could wear out your fingers punching in 50 lines, but there is a much better way!

The answer? Use the **FOR/NEXT/STEP** commands to do it for you. These commands will allow you to specify which statements are to be part of the **loop**, and how many times you want the loop executed. Since there are three commands, we will discuss this construct in three parts.

The FOR command defines the start of the loop and also sets the number of times the loop will be executed. A variable is then used to keep track of how many times the loop executed. To execute a loop 10 times, you might code the following:

10 FOR LOOP=1 TO 10

The first time through the loop, the variable LOOP is equal to 1. The next time it will be equal to 2, and so on, until it reaches 10. When the variable moves outside the range specified (1 to 10 in this example), then the loop ends and program continues by executing the statement following the NEXT command. (More on this in a moment).

In our example, LOOP will reach 11 and then the loop will terminate. You can use the value of LOOP in the executed statements as part of the loop:

10 GRAPHICS 7:COLOR 1

20 COLOR 1:FOR LOOP=10 TO 75:PLOT LOOP/2, LOOP:NEXT LOOP

Notice that the variable (LOOP in this case) does not need to start at 1. In fact, the variable does not even need to be an integer—FOR LOOP=.236 TO 10.11 will work just fine.

The end of the loop is denoted by the NEXT statement, as in line 20 above. The name of the loop variable from the FOR statement must also appear in the NEXT statement, again as it does in line 20: NEXT LOOP. Everything between the FOR statement and the NEXT statement will be executed as part of the loop. When the loop is finished, execution of the BASIC program will continue with the command following the NEXT statement:

10 REM a short example

20 FOR ROUNDNROUND=10 to 100:REM loop variable can have any valid name.

30 PRINT "Variable is now ";ROUNDNROUND

40 NEXT ROUNDNROUND:PRINT "Loop finished": PRINT "Variable is now ";ROUNDROUND

Note that the final value of the variable ROUNDNROUND is 101. As this is outside the range of 10 to 100, the loop ended. Also note that execution of the program continued with the PRINT statement following NEXT ROUNDNROUND, even though the PRINT statement is on the same line as the NEXT statement.

You are not limited to changing your loop variable by 1 each time. The STEP command will let you change your loop variable by any increment you want. If you leave out the STEP command, as we have in all the examples so far, then the *default* value of STEP 1 will be used by BASIC. Any other value of STEP must be specified. Decimal fractions can be used:

10 FOR XXX=1 TO 10 STEP .1

This example will execute 100 times—as XXX becomes 1.1, 1.2, etc.— until the loop ends when XXX=10.1.

STEP can also be negative:10 FOR XXX=10 TO 1 STEP -1:REM Blastoff

This line counts down from 10, ending the loop when XXX=0, which is outside the range of 10 to 1. STEP can be another variable or even be calculated:10 FOR XXX=1 TO 100 STEP (YYY+1.2)

Finally, if you use a STEP value of 0, then the loop will never be terminated, since the variable will never change!

HANGMAN

This month's listing is a game that plays just like the old paper-and-pencil standby, Hangman. The computer chooses a word, and prints the number of spaces that correspond to the number of letters in the word. You must try to figure out the correct word by guessing letters.

If you guess a letter which is in the word, that letter is placed in the appropriate blank space in the word. If the letter you guess is not in the word, then a piece of the poor fellow is drawn on the gallows. The letters you have guessed are printed across the bottom of the screen in case you forget. This goes on until you either guess all the letters in the word or you run out of chances.

The game illustrates how to use the IF/THEN and FOR/NEXT statements as part of a complete, functioning program. It also tests your knowledge of the terms important to your Atari. To add your own words, simply add more lines to the end of the program in the following format:

linenumber DATA word

Linenumber refers to a line number greater than the last line number in the program, DATA should be typed in just as shown, and word represents whatever you choose as your new word. Always make sure that the last line of this program contains the word END after the word DATA. This tells the program that all the words have been used. The program also keeps track of how many letters you needed to guess the word, and the percentage of correct words.

Listing on page 123

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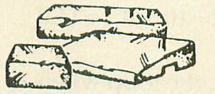
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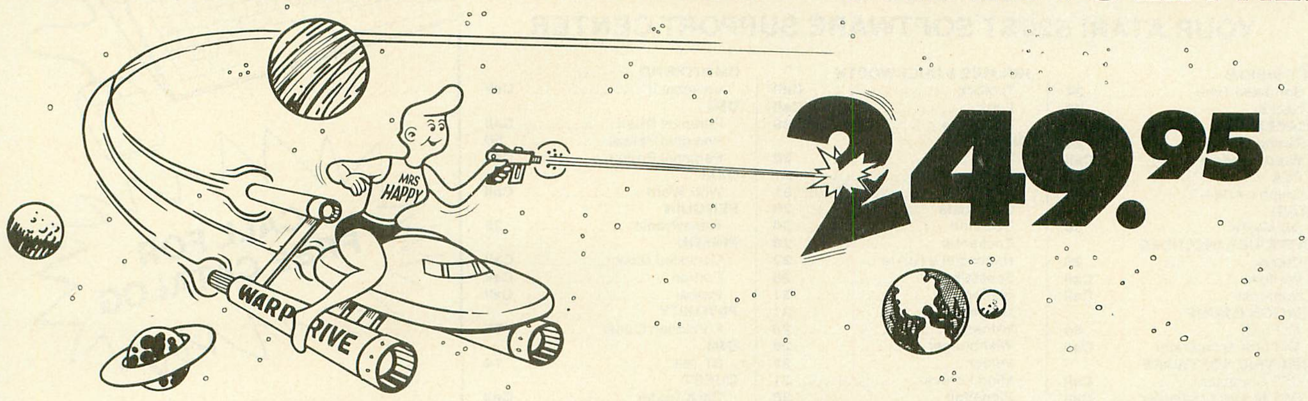
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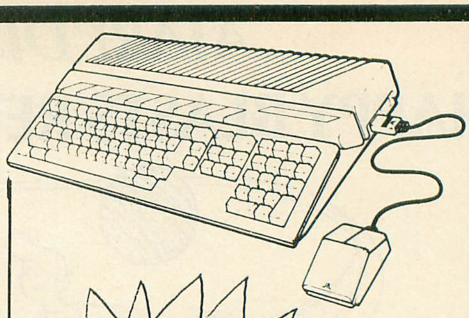
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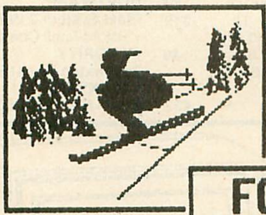
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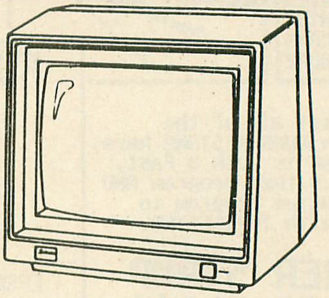
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Antic type-in listing section includes every full-length program from this issue.

DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

Antic program listings are typeset on the Star SB-10 printer — from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
♥	CTRL ,	●	CTRL T
	CTRL A		CTRL U
	CTRL B		CTRL V
	CTRL C		CTRL W
	CTRL D		CTRL X
	CTRL E		CTRL Y
	CTRL F		CTRL Z
	CTRL G		ESC ESC
	CTRL H	↑	ESC CTRL −
	CTRL I	↓	ESC CTRL =
	CTRL J	←	ESC CTRL +
	CTRL K	→	ESC CTRL *
	CTRL L	♦	CTRL .
	CTRL M	♠	CTRL ;
	CTRL N		SHIFT =
	CTRL O		ESC SHIFT CLEAR
	CTRL P	◀	ESC DELETE
	CTRL Q	▶	ESC TAB
	CTRL R		
	CTRL S		

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	⅄CTRL ,		⅄CTRL Y
	⅄CTRL A		⅄CTRL Z
	⅄CTRL B		ESC SHIFT DELETE
	⅄CTRL C		ESC SHIFT INSERT
	⅄CTRL D		ESC CTRL TAB
	⅄CTRL E		ESC SHIFT TAB
	⅄CTRL F		⅄CTRL .
	⅄CTRL G		⅄CTRL ;
	⅄CTRL H		⅄SHIFT =
	⅄CTRL I		ESC CTRL 2
	⅄CTRL J		ESC CTRL DELETE
	⅄CTRL K		ESC CTRL INSERT
	⅄CTRL L		
	⅄CTRL M		
	⅄CTRL N		
	⅄CTRL O		
	⅄CTRL P		
	⅄CTRL Q		
	⅄CTRL R		
	⅄CTRL S		
	⅄CTRL T		
	⅄CTRL U		
	⅄CTRL V		
	⅄CTRL W		
	⅄CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, ***hold it down*** while you press the next key. Whenever the ESC key is pressed, ***release*** it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key ◩ . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key ⅄ instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL			STANDARD		
		CTRL F	/		/
		CTRL G	\		SHIFT +
		CTRL N	_		SHIFT -
		CTRL R	-		−
		CTRL S	+		+

HOW TO USE TYPO II

TYPO II is the improved automatic proofreading program for **Antic's** type-in BASIC listings. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at left of the line number. Press [RETURN].

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPO II "

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

Don't type the TYPO II Codes!

```
ET 32120 ? "K":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

ERROR FILE

ATARI 'TOONS

August 1985

The 22nd character in line 1090 of listing 2 is an A. Also, to load non-standard character sets, change NUMBER=1024 in line 1140 to: NUMBER=2050, and change line 1150 to: 1150 GOTO 1170.

GUESS THAT SONG

July 1985

The September, 1985 HELP! section contains an easier-reading listing of some of the tougher data lines in Guess That Song.

STAR VENTURE

July 1985

Change line 380 to:

```
380 IF PEEK(53279
)=6 THEN SOUND 0,
0,0,0:GOTO 80
```

MUSICIAN

June 1985

Change line 790 to:

```
790 IF A=54 THEN
POSITION 4,22:? #
6;"song cleared":
GOTO 810
```

And if you're having tempo problems, remove line 1720 and add the following:

```
1715 IF A=14 THEN
 TEMPO=-0.25:GOTO
 1700
1720 REM REMOVE T
HIS LINE
```

MANEUVER

April 1985

If you get hearts on the title screen, LIST the program to disk or cassette, type NEW, then ENTER and SAVE it.

FONT MAKER FOR SG-10

March 1985

The July 1985 issue of ANTIC contains a listing which, when merged with FONT MAKER, makes that program work on the Star SG-10. See the HELP section of that issue for instructions.

CUSTOM PRINT

March 1985

Custom Print has problems printing certain characters using redefined characters. Change line 5 to:

```
5 CS=PEEK(106)-8:
POKE 106,CS-1:GRA
PHICS 0:DIM CST$(
20):CST$=""
```

graphics dump for non-graphics printers

POSTERMAKER

Article on page 36

LISTING 1

Don't type the TYPO II Codes!

```
SF 10 REM POSTER MAKER
HQ 20 REM BY MICHAEL KRUEGER
FW 30 REM (c) 1985, ANTIC PUBLISHING
BZ 70 GOSUB 160:A=131:B=0:IF C(0)<>32 THE
   N 130
VT 80 FOR A=191 TO 0 STEP -64:B=A-63:POKE
    77,0
HO 85 FOR X=0 TO 319 STEP 2:S=0:FOR Y=A T
   O B STEP -1:LOCATE X,Y,P:LOCATE X+1,Y,
   P1
LY 86 P=P*2+P1:IF P=0 THEN S=S+1:GOTO 110

VX 90 IF S>0 THEN FOR I=1 TO S:PUT #3,32:
   NEXT I:S=0
RN 100 PUT #3,C(P)
MW 110 NEXT Y:? #3:NEXT X:FOR I=1 TO 15:?
    #3:NEXT I:? #3:NEXT A
NU 120 END
OR 130 FOR A=191 TO 0 STEP -64:B=A-63:POK
   E 77,0
VX 135 FOR X=0 TO 319 STEP 2:S=0:FOR Y=A
   TO B STEP -1
QZ 136 LOCATE X,Y,P:LOCATE X+1,Y,P1:P=P*2
   +P1:PUT #3,C(P):NEXT Y:? #3:NEXT X
CE 140 FOR I=1 TO 15:? #3:NEXT I:? #3:NEX
   T A
OA 150 END
RW 160 DIM FN$(14),A$(10),MAIN$(342),L(4)
   ,C(4):OPEN #2,4,0,"K:"
OL 170 GRAPHICS 0:POKE 82,2:SETCOLOR 4,9,
   4:SETCOLOR 2,0,12:SETCOLOR 1,0,4:POKE
   752,1
VU 180 ? "K▸▸POSTER MAKER":? "▸      by Mi
   chael Krueger":? "↓Prints Micro Illust
   rator .PIC Files":?
OK 190 POKE 82,0:FN$="DIRECTORY":TRAP 250
   :OPEN #1,6,0,"D:*.PIC"
RJ 200 INPUT #1,A$:IF A$(2,2)=" " THEN ?
   A$(3);"  ";:GOTO 200
OV 210 POKE 82,2:CLOSE #1
QS 220 POKE 752,0:POSITION 2,14:? "Pictur
   e to print";:INPUT A$:POKE 752,1:?
YW 221 IF LEN(A$)<2 THEN 180
FY 222 IF A$(1,1)="D" AND (A$(2,2)=":" OR
    A$(3,3)=":") THEN FN$=A$:GOTO 240
FR 230 FN$="D:":FN$(3)=A$:FN$(LEN(FN$)+1)
   =".PIC"
RK 240 TRAP 250:OPEN #1,4,0,FN$:CLOSE #1:
   GOTO 260
JN 250 POKE 82,2:CLOSE #1:POSITION 2,16:?
    "CAN'T OPEN ";FN$;"[illegible]":? "↓Press any k
   ey.":GET #2,K:? "↑[illegible]↑↑[illegible]↑↑[illegible]";:GOTO 220
CK 260 TRAP 270:OPEN #3,8,0,"P:":GOTO 280

RW 270 CLOSE #3:? "PRINTER DOESN'T RESPON
   D":? "↓Press any key.":GET #2,K:? "↑[illegible]↑
   ↑[illegible]";:GOTO 260
VO 280 ? "The next screen shows how the p
   rinted":? "copy will look.  Use the [illegible],
    [illegible], [illegible], and"
IT 290 ? "[illegible] keys to alter the shades.  To
    print":? "the picture, press [illegible].  To a
   bort the"
JC 300 ? "dump, press [illegible].":? "↓Press any
    key to see ";A$;".";:GET #2,K
EG 310 GRAPHICS 8+16:JNK=USR(ADR("[illegible]"))
ZL 312 TRAP 320:GOSUB 420:GOTO 330
OD 320 POKE 559,34:RUN
NB 330 SETCOLOR 0,0,2:SETCOLOR 1,0,6:SETC
   OLOR 2,0,10:SETCOLOR 4,0,14
WJ 340 GET #2,K:IF K=42 THEN 390
FE 350 IF K=27 THEN RUN
IX 360 IF K<48 OR K>51 THEN 340
GC 370 IF K=48 THEN K=53
LF 380 R=K+659:P=PEEK(R):P=(P+2)*(P<14)+2
   :POKE R,P:GOTO 340
PA 390 FOR I=0 TO 4:RESTORE 410:FOR J=0 T
   O (PEEK(708+I)-2)/4:READ A$:NEXT J:C((
   I+1)*(I<4))=ASC(A$):NEXT I
ZA 400 RETURN
PY 410 DATA @,O,/, ,*
VU 420 RESTORE 460
OU 430 FOR A=1536 TO 1556
DC 440 READ B:POKE A,B
DC 450 NEXT A
HB 460 DATA 162,16,169,1,157,72,3,169,0,1
   57,73,3,32,86,228,48,1,96,104,104,96
OW 470 MAIN$="[illegible]"
FR 480 MAIN$(55)="[illegible]"
EQ 490 MAIN$(115)="[illegible]"
EI 500 MAIN$(175)="[illegible]"
UK 510 MAIN$(228)=CHR$(155)
TO 520 MAIN$(229)="[illegible]"
OI 530 MAIN$(291)="[illegible]"
YW 540 OPEN #1,4,0,FN$
NX 550 A=USR(ADR(MAIN$))
HN 560 CLOSE #1:RETURN
```

LISTING 2

```
MA 10 REM POSTER MAKER, LISTING 2
HQ 20 REM BY MICHAEL KRUEGER
FW 30 REM (c) 1985, ANTIC PUBLISHING
BL 35 REM (CREATES LINES 310, 470-530)
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
YX 70 FN$="D:STRINGS.LST":REM THIS IS THE
    NAME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "      ANTIC'S GENERIC
   BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")         "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "[illegible]TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
```

```
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
     LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? "COMPLETED
   "
LK 1000 DATA 558
SN 1010 DATA 0510490480320710820650800720
   73067083032056043049054058074078075061
   085083082040065068082040034
BR 1020 DATA 1041730480021330001730490021
   33001160199177000170041015201015208004
   202138145000136192255208238
UF 1030 DATA 1650880241050011330001650891
   05030133001160003177000153196002136016
   248096034041041155052055048
HE 1040 DATA 0320770650730780360610341041
   62016169007157066003169232157068003169
   000157069003169001157072003
RA 1050 DATA 1690001570730031690001332240
   32000006165224201007240013201013240016
   201026240060230224024144234
UZ 1060 DATA 0341550520560480320770650730
   78036040053053041061034165232133234024
   144244165232141196002230224
IH 1070 DATA 0320000061652321411970022302
   24032000006165232141198002230224032000
   006165232141199002230224032
CB 1080 DATA 0000061652321412000020241441
   96169000133236133034155052057048032077
   065073078036040049049053041
WJ 1090 DATA 0610342301650881332241332281
   65089133225133229032000006192136240094
   169000133227165232041128133
AN 1100 DATA 2351652320411271332262080140
   32000006165232133227032000006165232133
   226198226165235208028032000
AM 1110 DATA 0341550530480480320770650730
   78036040049055053041061034006165232133
   233024144047198226169255197
CT 1120 DATA 2262082451982271692551972272
   08237240183032000006165232133233024144
   019198226169255197226208238
PM 1130 DATA 1982271692551972272082302400
   34155053049048032077065073078036040050
   050056041061067072082036040
DQ 1140 DATA 0490530530411550530500480320
   77065073078036040050050057041061034096
   169002197234240082240201165
UP 1150 DATA 2331600001452240241690801012
   24133224169000101225133225230230169096
   197230208047169001197236208
TR 1160 DATA 0240241690011012281332281332
   24169000133236133230101229133229133034
   155053051048032077065073078
DU 1170 DATA 0360400050057049041061034225O
   24144017230236024169040101228133224169
   000133230101229133225165235
RC 1180 DATA 2401762081491652331600001452
   24024169001101224133224169000101225133
   225165235240151208229034155
```

de re joystick

JOYSTICK CURSOR

Article on page 27.

LISTING 1

```
MY 10 REM JOYSTICK CURSOR
WG 20 REM BY TED STOCKWELL
GL 30 REM (c) 1986, ANTIC PUBLISHING
LF 40 FOR LOCATION=272 TO 272+47
UY 50 READ BYTE
IM 60 POKE LOCATION,BYTE
NM 70 NEXT LOCATION
XZ 80 RESULT=USR(272)
HN 90 POKE 0,2
WT 100 DATA 104,160,27,162,1,169,6,32
BY 110 DATA 92,228,96,206,63,1,208,24
VE 120 DATA 165,0,141,63,1,173,120,2
EO 130 DATA 73,15,240,12,162,255,232,74
MS 140 DATA 144,252,189,59,1,141,252,2
HG 150 DATA 76,95,228,142,143,134,135,5
```

LISTING 2

```
0100 ;KEYJOY.M65
0110 ;BY TED STOCKWELL
0120 ;MODIFIED BY PATRICK BASS
0130 ;(c) 1986, ANTIC PUBLISHING
0140 ; V. 010786
0150        .SET 1,20
0160        .TAB 8,12,30
0170 TOTALCODE = ENDCODE-STARTCODE
0180        .OPT NO LIST
0190 ;-----------------------------
0200 ;
0210 STARTCODE = $0110
0220 SETVBV = $E45C   ;Set Vector.
0230 SYSVBV = $E45F   ;Do VBlank.
0240 VBSETCODE = 6
0250 STICK0 = $0278   ;Stick shadow.
0260 SPEED = $00      ;Repeat Speed.
0270 CH   =   $02FC
0280 CUR.UP = 142     ;Cursor Values.
0290 CUR.DOWN = 143
0300 CUR.LEFT = 134
0310 CUR.RIGHT = 135
0320 ;
0330 ;-------------------------
0340       *=   STARTCODE
0350 ;
0360 ;To activate, point the VBlank
            vector to our routine.
0370 INSTALL
0380       PLA
0390       LDY # <MAIN
0400       LDX # >MAIN
0410       LDA #VBSETCODE
0420       JSR SETVBV
0430       RTS
0440 ;
0450 ;-----------------------
0460 ;Now every vertical blank
          sends us here first.
0470 MAIN
0480       DEC COUNT    ;Bump down.
0490       BNE DONE     ;Branch out if
                         timer still on.
0500       LDA SPEED    ;Else refresh
0510       STA COUNT    ;delay counter.
```

continued on next page

```
0520 ;
0530        LDA STICK0    ;Get stick val
0540        EOR #$0F      ;Invert it.
0550        BEQ DONE      ;If 0, no press.
0560 ;
0570        LDX #$FF      ;Otherwise reset
                           key selector.
0580 MLOOP
0590        INX           ;point to next
                          ;key selection.
0600        LSR A         ;Check for bit.
0610        BCC MLOOP     ;Branch if no
                           bit available.
0620        LDA KEYS,X    ;Else grab Key
0630        STA CH        ;Store in shadow
0640 DONE
0650        JMP SYSVBV    ;Do rest of
                           Vertical Blank.
0660 ;
0670 ;---------------------------
0680 KEYS
0690        .BYTE CUR.UP,CUR.DOWN
0700        .BYTE CUR.LEFT,CUR.RIGHT
0710 ;
0720 COUNT
0730        .BYTE 5
0740 ;
0750 ENDCODE
0760        .END
```

database for backyard vegetable growers

DIGITAL GARDENER

Article on page 39

LISTING 1

Don't type the TYPO II Codes!

```
VB 1000 REM GARDEN LAYOUT PROGRAM
QE 1010 REM BY CHARLES BARTISH
NR 1015 REM (c) 1985, ANTIC PUBLISHING
MQ 1020 DIM R$(20),VEG$(600),TEMP$(600),D
   ISROW(30),DISPLT(30),PLTF4(30),HTSEQ(3
   0),ROWS(15),ROWZ(15),ROWGAR(70)
IS 1030 DIM BL$(20),GARDEN$(14),J$(21):J$
   ="HIT START TO CONTINUE":POKE 82,2
KN 1040 GRAPHICS 18:SETCOLOR 3,4,8
ZH 1050 POSITION 8,4:PRINT #6;"my"
XL 1060 POSITION 6,6:PRINT #6;"garden"
QP 1070 FOR N=1 TO 2000:NEXT N:PRINT #6;C
   HR$(125):PRINT #6
MX 1080 PRINT #6;" THIS PROGRAM WILL"
KC 1090 PRINT #6;"   ASSIST YOU IN"
LP 1100 PRINT #6;"PLANNING YOUR SPRING"
MI 1110 PRINT #6;" GARDEN, BUT YOU'LL"
VL 1120 PRINT #6;"  HAVE TO PLANT IT"
VA 1130 PRINT #6;"      YOURSELF!"
LS 1140 GOSUB 3380:REM INITIALIZE VEGETAB
   LE CHOICES AND USE DELAY AS DISPLAY TI
   MER
YZ 1150 LONG=30:WIDE=15:I=1:REM DEFAULT D
   IMENSIONS IN FEET
NA 1160 GOTO 2380:REM MENU
PS 1170 GOSUB 3200:REM DRAW PLOT
WI 1180 I=2
PQ 1190 GRAPHICS 0:POKE 82,1
JN 1200 PRINT "    SELECT THE SIZE OF YOUR
    GARDEN":? :?
QQ 1210 PRINT "IF YOU'RE NOT SURE OF THE
   PROPER SIZE,"
KI 1220 PRINT "ENTER 30 FOR LENGTH AND 15
    FOR WIDTH."
YK 1230 PRINT "WE'LL TELL YOU HOW MUCH RO
   OM YOU NEED.":PRINT :PRINT :PRINT
WS 1240 TRAP 1240:PRINT "THE LENGTH IN FE
   ET IS?":INPUT R$
UL 1250 LONG=VAL(R$)
QT 1260 TRAP 1260:PRINT "THE WIDTH IN FEE
   T IS?":INPUT R$
LF 1270 WIDE=VAL(R$):IF WIDE>LONG THEN N=
   LONG:LONG=WIDE:WIDE=N
QW 1280 FACT=LONG*WIDE/450
PA 1290 TRAP 40000
YN 1300 GOSUB 3200
XK 1310 REM PRINT VEGETABLE CHOICES
UD 1320 GRAPHICS 0:POKE 752,1:POKE 82,2
OF 1330 PRINT "      CHOOSE FROM THESE VEG
   ETABLES.":PRINT
PJ 1340 M=0:FOR N=1 TO 15:M=N+15
HE 1350 PRINT VEG$(N*20-19,N*20-2);VEG$(M
   *20-19,M*20-5)
HQ 1360 NEXT N
FE 1370 PRINT :PRINT :PRINT "LET'S PICK T
   HE VEGETABLES WE WANT.":PRINT J$
AI 1380 IF PEEK(53279)<>6 THEN 1380
XN 1390 GRAPHICS 0:PRINT :PRINT
PT 1400 PRINT "EACH VEGETABLE WILL FLASH
   ONTO THE":PRINT "SCREEN.  IF YOU WANT
   TO PLANT THAT"
AU 1410 PRINT "VEGETABLE, RESPOND WITH Y
   FOR YES.":PRINT "IF AN ITEM IS NOT WAN
   TED, JUST HIT"
NO 1420 PRINT "RETURN.":PRINT :PRINT
FI 1430 PRINT J$
WI 1440 IF PEEK(53279)<>6 THEN 1440
CE 1450 GRAPHICS 0:PRINT "            DO Y
   OU WANT....?"
WA 1460 I=1
HA 1470 FOR N=1 TO 30
KZ 1480 POSITION 2,3:PRINT VEG$(N*20-19,N
   *20):INPUT R$
SQ 1490 IF R$<>"Y" THEN 1530
KX 1500 VEG$(I*20-19,I*20)=VEG$(N*20-19,N
   *20)
EV 1510 DISROW(I)=DISROW(N):DISPLT(I)=DIS
   PLT(N):PLTF4(I)=INT(PLTF4(N)*FACT):HTS
   EQ(I)=HTSEQ(N)
KT 1520 I=I+1
AY 1530 PRINT "↑↑▣▣":NEXT N
MP 1540 M=I-1
BS 1550 GRAPHICS 0
CF 1560 PRINT "          YOU HAVE SELECTED.
   .....":PRINT :PRINT :FOR D=1 TO 200:NE
   XT D
QW 1570 FOR N=1 TO M
YJ 1580 PRINT VEG$(N*20-19,N*20)
ID 1590 NEXT N
PE 1600 PRINT :PRINT :PRINT "IF THE SELEC
   TION IS CORRECT,":PRINT "HIT RETURN. O
   THERWISE, TYPE 1"
UZ 1610 POKE 764,255:INPUT R$
TR 1620 IF R$="1" THEN PRINT :PRINT "WAIT
   ...":RESTORE 4000:GOSUB 3380:GOTO 1320
JV 1630 GOSUB 3080:REM DISK STORAGE
LK 1640 GRAPHICS 0:POKE 201,7
XE 1650 PRINT "          VEGETABLE PRODUCTI
   ON":PRINT
ID 1660 PRINT "VEGETABLE";"            ";"
   ROWS","PLANTS"
HG 1670 PRINT "▭▭▭▭▭▭▭▭▭";"            ";"
   ▭▭▭▭","▭▭▭▭▭▭"
```

```
WI 1680 J=0
RE 1690 FOR N=1 TO M
QQ 1700 ROWS(N)=(PLTF4(N)*DISPLT(N))/(12*
   (WIDE-1))
FH 1710 ROWS(N)=INT(ROWS(N)+0.5):IF ROWS(
   N)<1 THEN ROWS(N)=1
LF 1720 PRINT VEG$(N*20-19,N*20);ROWS(N),
   INT(PLTF4(N))
XC 1730 J=J+ROWS(N)
HS 1740 NEXT N
WE 1750 PRINT "  Total Rows      ";J
YM 1760 PRINT :PRINT :PRINT J$
DY 1770 IF PEEK(53279)<>6 THEN 1770
SN 1780 PRINT "↑↑":PRINT " •CHANGE ROWS/P
   LANT NUMBERS: 1 RETURN":I=1
VB 1790 PRINT " •LOOK AT PLANT LIST AGAIN
   :  2 RETURN"
DT 1800 PRINT " •CONTINUE -- JUST PRESS:
      RETURN "
SY 1810 INPUT R$:IF R$="1" THEN GOSUB 347
   0:GOSUB 3080
WH 1820 IF R$="2" THEN 1640
DL 1830 IF I>1 THEN 1640
YR 1840 REM PLANT THE GARDEN.  SEARCH FOR
    TALLEST PLANT
JH 1850 POKE 82,0:I=0:II=0:LGARD=0:GRAPHI
   CS 0:POKE 752,1:PRINT "          GA
   RDEN SUMMARY"
WM 1860 POSITION (40-LEN(GARDEN$)+6)/2,1:
   PRINT GARDEN$(3,LEN(GARDEN$)-4):PRINT
CX 1870 PRINT "VEGETABLE          DISP  R
   OWS DISR SUM"
NX 1880 PRINT "---------          ----  -
   --- ---- ---"
QN 1890 PRINT "                   inches  #
    inches feet":PRINT
CO 1900 POKE 201,5:RM=0
OY 1910 FOR J=1 TO M
LG 1920 HTSEQ=30:GOSUB 3700:HTSEQ(I)=HTSE
   Q(I)+30
TH 1930 FOR K=1 TO ROWS(I)
TG 1940 II=II+1
OU 1950 IF II>70 THEN GOSUB 3950:END
EO 1960 IF K=1 AND RM>DISROW(I) THEN ROWG
   AR(II)=LGARD+RM:GOTO 1980
CK 1970 ROWGAR(II)=LGARD+DISROW(I)
YZ 1980 ROWGAR(1)=6
UM 1990 LGARD=ROWGAR(II)
FM 2000 NEXT K
YZ 2010 RM=DISROW(I)
GQ 2020 TEMP$(3*J-2,3*J)=VEG$(I*20-19,I*2
   0-17):ROWZ(J)=ROWS(I):REM STORE DATA F
   OR PLOTTING
UR 2025 LTOT=INT(10*LGARD/12)/10:IF LTOT>
   99.9 THEN LTOT=INT(LTOT)
JG 2030 PRINT VEG$(I*20-19,I*20-2);DISPLT
   (I),ROWS(I),DISROW(I),LTOT
FN 2040 NEXT J
HM 2050 FOR J=1 TO M:HTSEQ(J)=HTSEQ(J)-30
   :NEXT J
FT 2060 LGARD=LGARD/12+0.5:LGARD=INT(LGAR
   D+0.5)
BP 2070 PRINT :PRINT "***THE GARDEN LENGT
   H IS ";LGARD;" feet";"***"
WD 2080 PRINT "***THE GARDEN WIDTH  IS ";
   WIDE;" feet";"***"
ML 2090 IF LGARD>1.15*LONG THEN 3820
OI 2100 PRINT :PRINT " START TO PLOT THE
   GARDEN."
QT 2110 PRINT " START AFTER PLOT TO GET T
   HIS PAGE."
XJ 2111 PRINT " SELECT FOR PRINTOUT."
ML 2115 PRINT " OPTION TO RERUN PROGRAM."
   ;
KJ 2120 IF PEEK(53279)=3 THEN ? :? "PLEAS
   E WAIT...":RESTORE 4000:GOSUB 3380:GOT
   O 1150
YA 2125 IF PEEK(53279)=6 THEN 2130
WA 2126 IF PEEK(53279)=5 THEN 5000
PW 2127 GOTO 2120
CG 2130 GRAPHICS 7:POKE 709,198:COLOR 2:R
   EM COLOR 2 GREEN
HB 2140 J=142
UL 2150 K=J*WIDE/LGARD
QD 2160 IF K>80 THEN J=0.95*J:GOTO 2150
NR 2170 POKE 710,0:REM COLOR 3 BLACK
EA 2180 PLOT 150,79
JE 2190 DRAWTO 150,79-K:DRAWTO 150-J,79-K
   :POSITION 150-J,79
RC 2200 POKE 765,2
LE 2210 XIO 18,#6,0,0,"S:"
UX 2220 II=0:KOLOR=1
FC 2230 POKE 708,14:REM COLOR 1 WHITE
QI 2240 FOR N=1 TO M
YB 2250 IF KOLOR>3 THEN KOLOR=1
FE 2260 COLOR KOLOR
CC 2270 FOR I=1 TO ROWZ(N)
TF 2280 II=II+1
MN 2290 IF I=1 THEN GOSUB 3740
CV 2300 PLOT 150-J+(ROWGAR(II)/12)*J/LGAR
   D,76
NT 2310 DRAWTO 150-J+(ROWGAR(II)/12)*J/LG
   ARD,80-K+2
FC 2320 NEXT I
DT 2330 KOLOR=KOLOR+2
HL 2340 NEXT N
UN 2350 POKE 77,0:IF PEEK(53279)<>6 THEN
   2350
RU 2360 POKE 82,2:GOTO 1850
PQ 2370 REM END OF MAIN PROGRAM. SUBROUTI
   NES FOLLOW
BL 2380 REM MENU
PA 2390 GRAPHICS 0:SETCOLOR 2,9,2
RN 2400 TRAP 2390
VK 2410 PRINT "                   CHOICES":P
   RINT :PRINT
FP 2420 PRINT "     MAKE NEW GARDEN
    1"
HQ 2430 PRINT "     RECALL PREVIOUS GARDEN
    2"
DK 2440 PRINT :PRINT :PRINT "  TYPE NUMBE
   R OF CHOICE, RETURN";
AO 2450 INPUT R$:I=VAL(R$)
GH 2460 IF I>2 THEN 2390
OZ 2470 TRAP 40000
JL 2480 ON I GOTO 2490,2570
CT 2490 GOSUB 2810
RS 2500 PRINT :PRINT "GIVE THE GARDEN A N
   AME, e.g., CMB1985."
KN 2510 PRINT "I'LL ADD THE SUFFIX .GAR T
   O THE NAME."
KX 2520 INPUT R$
SF 2530 GARDEN$="D:"
HO 2540 GARDEN$(3)=R$
TC 2550 GARDEN$(LEN(GARDEN$)+1)=".GAR"
RQ 2560 GOTO 1170
CP 2570 GOSUB 2810
HD 2580 PRINT :PRINT "WHICH GARDEN DO YOU
    WANT TO RECALL"
VJ 2590 INPUT R$:IF R$(LEN(R$)-3)=".GAR"
   THEN R$=R$(1,LEN(R$)-4)
RY 2600 GARDEN$="D:"
HH 2610 GARDEN$(3)=R$
SV 2620 GARDEN$(LEN(GARDEN$)+1)=".GAR"
OS 2630 REM OPEN DISK FILE TO INPUT STORE
   D DATA
WI 2640 OPEN #1,4,0,GARDEN$
HG 2650 INPUT #1;WIDE
CJ 2660 INPUT #1;FACT
UO 2670 INPUT #1;M
YC 2680 INPUT #1;TEMP$:VEG$(1,200)=TEMP$
XF 2690 INPUT #1;TEMP$:VEG$(201,400)=TEMP
   $
AO 2700 INPUT #1;TEMP$:VEG$(401,600)=TEMP
   $
OL 2710 FOR I=1 TO M
DS 2720 INPUT #1;TMP:ROWS(I)=TMP
WM 2730 INPUT #1;TMP:HTSEQ(I)=TMP
OH 2740 INPUT #1;TMP:DISROW(I)=TMP
HH 2750 INPUT #1;TMP:DISPLT(I)=TMP
YN 2760 INPUT #1;TMP:PLTF4(I)=TMP
FZ 2770 NEXT I
NW 2780 CLOSE #1
DI 2790 GOTO 1640:REM RETURN TO MAIN PROG
   RAM TO PLOT RECALLED DATA
BQ 2800 REM SUBROUTINE TO PRINT DISK DIRE
   CTORY
LG 2810 SETCOLOR 2,12,2:PRINT "K
       DIRECTORY":PRINT
OF 2820 R$="D:*.GAR"
RG 2830 OPEN #1,6,0,R$
UC 2840 TRAP 2880
LL 2850 INPUT #1,R$
JS 2860 PRINT R$
UQ 2870 GOTO 2850
SZ 2880 CLOSE #1:TRAP 40000:PRINT
BR 2890 RETURN
KE 2900 REM OPEN DISK FILE TO PRINT STORE
   D DATA
```

continued on next page

```
YJ 2910 OPEN #1,8,0,GARDEN$
FG 2920 PRINT #1;WIDE
AJ 2930 PRINT #1;FACT
SO 2940 PRINT #1;M
CH 2950 TEMP$=VEG$(1,200):PRINT #1;TEMP$
KO 2960 TEMP$=VEG$(201,400):PRINT #1;TEMP
   $
NP 2970 TEMP$=VEG$(401,600):PRINT #1;TEMP
   $
PK 2980 FOR I=1 TO M
ZJ 2990 TMP=ROWS(I):PRINT #1;TMP
SD 3000 TMP=HTSEQ(I):PRINT #1;TMP
DC 3010 TMP=DISROW(I):PRINT #1;TMP
YW 3020 TMP=DISPLT(I):PRINT #1;TMP
DN 3030 TMP=PLTF4(I):PRINT #1;TMP
FD 3040 NEXT I
NA 3050 CLOSE #1
NU 3060 PRINT "DISK SAVE COMPLETE":FOR I=
   1 TO 200:NEXT I
AW 3070 RETURN
LS 3080 REM DISK STORAGE SUBROUTINE
OV 3090 GRAPHICS 0:SETCOLOR 2,9,2
UE 3100 PRINT "                DISK STORAGE
   ":PRINT
KG 3110 PRINT "DO YOU WISH TO STORE THIS
   GARDEN?":PRINT "IF YOU DO, HIT Y AND R
   ETURN."
GD 3120 PRINT :PRINT "CURRENT GARDEN NAME
    IS ";GARDEN$(3)
RA 3130 INPUT R$:IF R$<>"Y" THEN 3180
AM 3140 PRINT :PRINT "DO YOU WANT A DIFFE
   RENT NAME?":PRINT "IF YOU DO, HIT Y AN
   D RETURN."
KL 3150 INPUT R$:IF R$<>"Y" THEN GOSUB 29
   10:GOTO 3180
FB 3160 PRINT "TYPE IN NEW NAME. I'LL ADD
    THE .GAR"
AW 3170 INPUT R$:GARDEN$(3)=R$:GARDEN$(LE
   N(GARDEN$)+1)=".GAR":PRINT GARDEN$:GOS
   UB 2910
BB 3180 RETURN
EG 3190 REM LENGTH AND WIDTH PLOT
OH 3200 GRAPHICS 0:POKE 752,1
ZU 3210 IF I=1 THEN POKE 710,0
XK 3220 IF I=2 THEN POKE 710,196:POKE 709
   ,204
EX 3230 POSITION 19,3:PRINT LONG:POSITION
    36,12:PRINT WIDE:POSITION 5,4
GR 3240 FOR N=1 TO 15:PRINT CHR$(124):POS
   ITION 5,4+N:NEXT N:PRINT CHR$(26)
DZ 3250 FOR N=1 TO 30:POSITION 5+N,19:PRI
   NT CHR$(18):NEXT N:POSITION 35,19:PRIN
   T CHR$(3)
ZM 3260 FOR N=1 TO 15:POSITION 35,19-N:PR
   INT CHR$(124):NEXT N:POSITION 35,4:PRI
   NT CHR$(5)
GE 3270 FOR N=1 TO 30:POSITION 35-N,4:PRI
   NT CHR$(18):POSITION 35-N,4:NEXT N:PRI
   NT CHR$(17)
YR 3280 IF I=1 THEN POSITION 6,7:PRINT "W
   HAT SIZE GARDEN DO YOU WANT?"
BV 3290 IF I=1 THEN BL$="   MY ":TEMP$="
   US"
BA 3300 IF I=2 THEN BL$=" YOUR ":TEMP$="
   YOU"
RC 3310 POSITION 6,9:PRINT BL$;WIDE;"x";L
   ONG;" PLOT GIVES";TEMP$
TC 3320 POSITION 6,10:PRINT " PLENTY OF F
   RESH VEGETABLES,"
CJ 3330 POSITION 6,11:PRINT " AND IS NOT
   A FULLTIME CHORE"
VL 3340 POSITION 6,12:PRINT " TO MAINTAIN
   ."
LQ 3350 POSITION 6,18:PRINT J$
AA 3360 IF PEEK(53279)<>6 THEN 3360
BC 3370 RETURN
WY 3380 BL$=" ":BL$(20)=BL$:BL$(2)=BL$
HG 3390 FOR N=1 TO 30
NE 3400 READ TEMP$,I,J,K,L:DISROW(N)=I:DI
   SPLT(N)=J:PLTF4(N)=K:HTSEQ(N)=L
GN 3410 FOR P=1 TO 20
CE 3420 TL=LEN(TEMP$):IF TL<20 THEN TEMP$
   (TL+1)=BL$
IH 3430 NEXT P
XQ 3440 VEG$(N*20-19,N*20)=TEMP$
HR 3450 NEXT N
BB 3460 RETURN
UN 3470 I=I+1:FOR N=1 TO M:GRAPHICS 0
CU 3480 PRINT "                 CHANGES"
YD 3490 PRINT :PRINT :PRINT "TO CHANGE NU
   MBER OF ROWS,   TYPE R.":PRINT "TO CHA
   NGE NUMBER OF PLANTS, TYPE P."
ZW 3500 PRINT "OTHERWISE, HIT RETURN.":PR
   INT
MO 3510 PRINT "***************************
   ***********"
LZ 3520 PRINT :PRINT :PRINT :PRINT "VEGET
   ABLE            ";"ROWS","PLANTS"
PI 3530 PRINT "□□□□□□□□□□              ";"□□□
   □","□□□□□□□"
WF 3540 PRINT VEG$(N*20-19,N*20);ROWS(N),
   PLTF4(N)
LH 3550 INPUT R$
MP 3560 IF R$="R" THEN GOSUB 3600
RH 3570 IF R$="P" THEN GOSUB 3650
IC 3580 NEXT N
BM 3590 RETURN
OG 3600 PRINT :PRINT "ENTER THE NEW NUMBE
   R OF ROWS"
KX 3610 INPUT R$
WH 3620 ROWS(N)=VAL(R$)
OJ 3630 PLTF4(N)=(ROWS(N)*12*(WIDE-1))/DI
   SPLT(N)
AZ 3640 RETURN
MK 3650 PRINT :PRINT "ENTER THE NEW NUMBE
   R OF PLANTS"
LM 3660 INPUT R$
JA 3670 PLTF4(N)=VAL(R$)
RO 3680 ROWS(N)=(PLTF4(N)*DISPLT(N))/(12*
   (WIDE-1))
BO 3690 RETURN
QH 3700 FOR N=1 TO M
CS 3710 IF HTSEQ(N)<HTSEQ THEN HTSEQ=HTSE
   Q(N):I=N
HO 3720 NEXT N
AY 3730 RETURN
NL 3740 JJ=(J/142)*38:KK=INT((ROWGAR(II)/
   12)*(JJ-2)/LGARD)
PC 3750 FOR JJJ=0 TO 3
GY 3760 POKE 752,1:POKE 656,JJJ:POKE 657,
   40-JJ+KK
LE 3770 IF JJJ=3 THEN PRINT ROWZ(N);"+":G
   OTO 3790
FV 3780 PRINT TEMP$(3*N-2+JJJ,3*N-2+JJJ)
ZV 3790 NEXT JJJ
AR 3800 RETURN
JQ 3810 REM ERROR SUBROUTINES
EJ 3820 GRAPHICS 0:? :? "THE LENGTH IS GR
   EATER THAN YOUR LIMIT.":? "   PICKED",
   LONG:? "   ACTUAL",LGARD
PE 3830 PRINT :PRINT :PRINT "        HER
   E ARE YOUR OPTIONS"
FZ 3840 PRINT :PRINT "OPTION
          KEY"
IT 3850 PRINT "□□□□□□
   □□□":PRINT
OK 3860 PRINT "ACCEPT NEW LENGTH--CONTINU
   E        1"
NF 3870 PRINT "REDUCE SPACING OF ALL BY 1
   0%       2"
SM 3880 PRINT "CHANGE NUMBER OF ROWS/PLAN
   TS       3"
UR 3890 PRINT "CHANGE DATA OF CERTAIN VEG
            4"
RT 3900 TRAP 3820:PRINT :INPUT R$
HY 3910 ON VAL(R$) GOTO 3920,3930,1640,39
   40
AH 3920 TRAP 40000:LONG=LGARD:GOTO 1850
AZ 3930 TRAP 40000:FOR J=1 TO M:DISROW(J)
   =INT(0.9*DISROW(J)):NEXT J:GOTO 1850
SS 3940 TRAP 40000:GRAPHICS 0:LIST 4000,4
   290:END
QK 3950 PRINT :PRINT "YOU HAVE EXCEEDED 7
   0 ROWS.":PRINT "EITHER REDIMENSION 'RO
   WGAR' IN"
BB 3960 PRINT "LINE 1020, OR REDUCE THE S
   IZE OF YOUR":PRINT "GARDEN!"
IO 3970 PRINT "THE GRAPHIC RESOLUTION WIL
   L BE POOR!"
BR 3980 RETURN
FT 3990 REM DATA VEGETABLE, ROW DISTANCE,
   PLANT DISTANCE, STANDARD NUMBER OF PLA
   NTS, HEIGHT SEQUENCE
JI 4000 DATA ASPARAGUS,42,18,10,3
GP 4010 DATA BEANS--SNAP BUSH,18,4,172,18
PU 4020 DATA BEANS--SNAP POLE,36,6,58,1
WA 4030 DATA BEANS--LIMA,24,3,228,8
JQ 4040 DATA BEETS,20,2,85,12
MI 4050 DATA BROCCOLI,24,18,6,9
```

```
WQ 4060 DATA BRUSSELS SPROUTS,24,18,6,10
TY 4070 DATA CABBAGE,24,18,10,19
ND 4080 DATA CANTELOUPE,60,24,8,20
IY 4090 DATA CARROTS,12,2,85,26
SZ 4100 DATA CAULIFLOWER,24,18,6,11
HL 4110 DATA CELERY,24,6,29,13
PL 4120 DATA CB1-BRUS/BRO/CAU,24,18,6,9
CR 4130 DATA CB2-CARRT/RADSH,12,2,85,26
ZB 4140 DATA CORN,12,12,45,2
PG 4150 DATA CUCUMBERS,36,18,10,5
KP 4160 DATA EGGPLANT,24,18,10,6
JL 4170 DATA LETTUCE--HEAD,18,12,15,16
IM 4180 DATA LETTUCE--LEAF,18,3,57,25
OV 4190 DATA ONIONS,12,4,129,24
DD 4200 DATA PEAS,24,3,228,7
FH 4210 DATA PEPPERS,24,18,10,17
AG 4220 DATA POTATOES,30,12,45,14
DZ 4230 DATA PUMPKINS,60,24,8,22
QH 4240 DATA RADISHES,12,1,85,28
VQ 4250 DATA SPINACH,18,3,57,27
JE 4260 DATA SQUASH,48,18,10,21
BR 4270 DATA TOMATOES,36,36,15,4
TV 4280 DATA TURNIPS,18,2,85,15
YG 4290 DATA WATERMELON,72,36,5,23
ZL 5000 I=0:II=0:LGARD=0:LPRINT ,"GARDEN
   SUMMARY"
HX 5010 LPRINT ,GARDEN$(3,LEN(GARDEN$)-4)
   :PRINT
WO 5020 LPRINT "VEGETABLE          DISP
   ROWS DISR SUM"
LB 5030 LPRINT "----------          ----
   ---- ---- ---"
BA 5040 LPRINT "                    inches
   #  inches feet":LPRINT
CP 5050 POKE 201,5:RM=0
OZ 5060 FOR J=1 TO M
LH 5070 HTSEQ=30:GOSUB 3700:HTSEQ(I)=HTSE
   Q(I)+30
TI 5080 FOR K=1 TO ROWS(I)
TH 5090 II=II+1
NT 5100 IF II>70 THEN GOSUB 3950:END
IB 5110 IF K=1 AND RM>DISROW(I) THEN ROWG
   AR(II)=LGARD+RM:GOTO 5130
BJ 5120 ROWGAR(II)=LGARD+DISROW(I)
XY 5130 ROWGAR(1)=6
TL 5140 LGARD=ROWGAR(II)
GG 5150 NEXT K
ZT 5160 RM=DISROW(I)
HK 5170 TEMP$(3*J-2,3*J)=VEG$(I*20-19,I*2
   0-17):ROWZ(J)=ROWS(I):REM STORE DATA F
   OR PLOTTING
UU 5180 LTOT=INT(10*LGARD/12)/10:IF LTOT>
   99.9 THEN LTOT=INT(LTOT)
PE 5190 LPRINT VEG$(I*20-19,I*20-2);DISPL
   T(I),ROWS(I),DISROW(I),LTOT
FI 5200 NEXT J
HH 5210 FOR J=1 TO M:HTSEQ(J)=HTSEQ(J)-30
   :NEXT J
FO 5220 LGARD=LGARD/12+0.5:LGARD=INT(LGAR
   D+0.5)
RZ 5230 LPRINT :LPRINT "***THE GARDEN LEN
   GTH IS ";LGARD;" feet";"***"
FJ 5240 LPRINT "***THE GARDEN WIDTH  IS "
   ;WIDE;" feet";"***"
MG 5250 IF LGARD>1.15*LONG THEN 3820
TT 5260 GOTO 1850
```

starting out

NEW OWNERS COLUMN

Article on page 107

LISTING 1

Don't type the TYPO II Codes!

```
RO 10 REM THE NEW OWNERS COLUMN
ZS 20 REM THE HANGMAN GAME
PR 30 REM BY DAVID PLOTKIN
FX 40 REM (c) 1985, ANTIC PUBLISHING
DE 50 DIM ANSWER$(40),LTR$(1),HOLD(40)
FA 55 NUMCORRECT=0:TOTAL=0
WA 60 GRAPHICS 7:CTR=0:YES=0:CORRECT=0:IN
   CORRECT=0:SETCOLOR 0,2,4:SETCOLOR 1,12
   ,10:GOSUB 610:REM DRAW GALLOWS
TO 65 FOR LP=1 TO 40:HOLD(LP)=0:NEXT LP
FZ 70 READ ANSWER$:REM GET THE WORD TO PL
   AY WITH FROM THE DATA STATEMENTS
IN 80 IF ANSWER$="END" THEN GOTO 660:REM
   TEST FOR ALL DATA USED...GO TO END OF
   THE GAME IF IT IS.
OI 85 TOTAL=TOTAL+1
RI 90 FOR LP=1 TO LEN(ANSWER$):REM LOOP T
   O THE LENGTH OF THE WORD
KC 100 POKE 656,0:POKE 657,LP*2:PRINT "_"
   ;:REM PRINT THE UNDERLINE BLANKS FOR T
   HE WORD
ZL 110 NEXT LP:POKE 656,2:POKE 657,24:PRI
   NT " ";
DQ 115 POKE 656,2:POKE 657,25:PRINT " ";
IG 119 REM ‹=
XH 120 LTR$="":POKE 656,2:POKE 657,0:PRIN
   T "WHAT LETTER DO YOU GUESS";:INPUT LT
   R$
NO 130 IF LTR$="" THEN GOTO 115
YC 140 CTR=CTR+1:REM UPDATE THE COUNTER
   FOR A SUCCESSFUL LETTER CHOICE.
WZ 150 POKE 656,3:POKE 657,CTR:PRINT LTR$
   ;
NI 160 FOR ZIP=200 TO 100 STEP -10:SOUND
   0,ZIP,10,4:NEXT ZIP:SOUND 0,0,0,0:REM
   SOME SOUND
KM 170 FOR LP=1 TO LEN(ANSWER$):REM LOOP.
   ..
YL 175 IF ANSWER$(LP,LP)=LTR$ AND HOLD(LP
   )=0 THEN HOLD(LP)=1:YES=1:CORRECT=CORR
   ECT+1
LN 180 IF ANSWER$(LP,LP)=LTR$ THEN POKE 6
   56,0:POKE 657,LP*2:PRINT LTR$
HX 190 IF ANSWER$(LP,LP)=LTR$ THEN FOR ZI
   P=50 TO 150 STEP 10:SOUND 0,ZIP,12,4:N
   EXT ZIP:SOUND 0,0,0,0
FF 200 NEXT LP:IF YES=1 THEN YES=0:GOTO 2
   50
MP 210 INCORRECT=INCORRECT+1
LM 220 FOR ZIP=10 TO 50:SOUND 0,ZIP,8,4:N
   EXT ZIP:SOUND 0,0,0,0
YF 230 ON INCORRECT GOSUB 710,750,790,830
   ,870,910,950,990
KS 240 IF INCORRECT=8 THEN GOTO 410
BB 250 IF CORRECT=LEN(ANSWER$) THEN GOTO
   510
OM 260 GOTO 115
YT 400 REM OH,OH...YOU ARE HUNG!
WH 410 COLOR 3:PLOT 123,13:DRAWTO 123,19:
   PLOT 120,30:DRAWTO 126,30:PRINT CHR$(1
   25):POKE 656,1:POKE 657,16
UE 420 PRINT "***HUNG***":FOR PP=100 TO 2
   00 STEP 2:SOUND 0,PP,10,4:SOUND 1,250-
   PP,10,4:NEXT PP
DC 430 SOUND 0,0,0,0:SOUND 1,0,0,0:POKE 6
```

continued on next page

```
   56,3:POKE 657,3:PRINT "PRESS RETURN TO
    CONINUE...";:INPUT LTR$
RL 440 GOTO 60
FT 500 REM GOT THE CORRECT ANSWER
EY 510 FOR PP=50 TO 150:SOUND 0,PP,10,4:S
   OUND 1,PP+10,10,4:POKE 712,PP:NEXT PP:
   SOUND 0,0,0,0:SOUND 1,0,0,0
EC 520 POKE 712,0:NUMCORRECT=NUMCORRECT+1

RK 530 GOTO 60
YI 600 REM DRAW THE GALLOWS
TI 610 COLOR 2:FOR PP=70 TO 78:PLOT 100,P
   P:DRAWTO 140,PP:NEXT PP
VE 620 COLOR 1:FOR PP=10 TO 69:PLOT 102,P
   P:DRAWTO 106,PP:NEXT PP
BE 630 FOR PP=6 TO 9:PLOT 102,PP:DRAWTO 1
   25,PP:NEXT PP:FOR PP=10 TO 12:PLOT 121
   ,PP:DRAWTO 125,PP:NEXT PP
ZK 640 RETURN
DN 650 REM ALL DATA USED...
BK 660 PRINT CHR$(125):POKE 656,1:POKE 65
   7,3:PRINT "ALL THE DATA USED":POKE 656
   ,2:POKE 657,3
SB 670 PRINT "PERCENT CORRECT:";NUMCORREC
   T/TOTAL*100;"%";:POKE 656,3:POKE 657,3
   :LTR$=""
KK 680 PRINT "PLAY AGAIN (Y/N)";:INPUT LT
   R$:IF LTR$="Y" THEN RESTORE :GOTO 55
JD 690 GRAPHICS 0:PRINT "GOOD BYE TILL NE
   XT TIME":END
AQ 700 REM DRAW THE HEAD
UX 710 COLOR 1:FOR PP=20 TO 28:PLOT 120,P
   P:DRAWTO 128,PP:NEXT PP:COLOR 2:PLOT 1
   22,23:PLOT 126,23:PLOT 124,25
DA 720 PLOT 123,27:DRAWTO 125,27:COLOR 0:
   PLOT 120,20:PLOT 128,20:PLOT 120,28:PL
   OT 128,28
ZJ 730 RETURN
MH 740 REM DRAW THE NECK
YC 750 COLOR 1:FOR PP=29 TO 31:PLOT 123,P
   P:DRAWTO 125,PP:NEXT PP
ZR 770 RETURN
XR 780 REM DRAW THE BODY
FD 790 FOR PP=32 TO 50 STEP 2:COLOR 2:PLO
   T 118,PP:DRAWTO 130,PP:COLOR 3:PLOT 11
   8,PP+1:DRAWTO 130,PP+1:NEXT PP
ZG 810 RETURN
UR 820 REM DRAW THE LEFT ARM
WW 830 FOR PP=32 TO 36 STEP 2:COLOR 2:PLO
   T 115,PP:DRAWTO 117,PP:COLOR 3:PLOT 11
   5,PP+1:DRAWTO 117,PP+1:NEXT PP
GI 840 FOR PP=32 TO 42 STEP 2:COLOR 2:PLO
   T 110,PP:DRAWTO 114,PP:COLOR 3:PLOT 11
   0,PP+1:DRAWTO 114,PP+1:NEXT PP
ZO 850 RETURN
WB 860 REM DRAW THE RIGHT ARM
CC 870 FOR PP=32 TO 36 STEP 2:COLOR 2:PLO
   T 131,PP:DRAWTO 133,PP:COLOR 3:PLOT 13
   1,PP+1:DRAWTO 133,PP+1:NEXT PP
QQ 880 FOR PP=32 TO 42 STEP 2:COLOR 2:PLO
   T 134,PP:DRAWTO 138,PP:COLOR 3:PLOT 13
   4,PP+1:DRAWTO 138,PP+1:NEXT PP
ZW 890 RETURN
MF 900 REM DRAW LEFT LEG
MB 910 FOR PP=52 TO 60 STEP 2:COLOR 2:PLO
   T 118,PP:DRAWTO 122,PP:COLOR 3:PLOT 11
   8,PP+1:DRAWTO 122,PP+1:NEXT PP
XS 920 COLOR 1:FOR PP=61 TO 64:PLOT 116,P
   P:DRAWTO 122,PP:NEXT PP
ZL 930 RETURN
NP 940 REM DRAW THE RIGHT LEG
BV 950 FOR PP=52 TO 60 STEP 2:COLOR 2:PLO
   T 126,PP:DRAWTO 130,PP:COLOR 3:PLOT 12
   6,PP+1:DRAWTO 130,PP+1:NEXT PP
BG 960 COLOR 1:FOR PP=61 TO 64:PLOT 126,P
   P:DRAWTO 132,PP:NEXT PP
ZT 970 RETURN
LD 980 REM HUNG!
ZX 990 RETURN
LH 1000 REM DATA FOR THE GAME
MR 1010 DATA ATARI,COMPUTER,DISK
JL 1020 DATA ANTIC,PROGRAM,CARTRIDGE
DX 1030 DATA SCREEN,MEMORY,COUNTER
EQ 1040 DATA MODEM,BASIC,PRINTER
YM 1050 DATA DEBUG,KEYBOARD,MANUAL
TU 1060 DATA JOYSTICK,PADDLE,GRAPHICS
YT 1070 DATA SOUND,COLOR
KQ 1080 DATA END
```

game of the month

ROCKSLIDE

Article on page 97

LISTING 1

Don't type the TYPO II Codes!

```
EY 10 REM ROCKSLIDE
WQ 20 REM BY JAMES HAGUE
GL 30 REM (c) 1986, ANTIC PUBLISHING
JK 40 POKE 106,PEEK(740)-5:GRAPHICS 18:CH
   SET=(PEEK(106)+1)*256:POKE 752,1
AZ 45 POKE 712,66:POKE 708,152
JE 50 ? #6:? #6:? #6;"      ANTIC":? #6:? #
   6;"     PRESENTS..."
AP 100 GOSUB 15000:REM REDEFINE C-SET
EY 110 GOSUB 10000:REM INITS.
FO 120 GOSUB 7000:REM TITLE SCREEN
YY 140 PL=C0
VJ 150 GOSUB 5000:REM SET-UP LEVEL
DC 160 POKE 18,C0:POKE 19,C0:POKE 20,C0
LI 165 REM MAIN LOOP
TN 170 IF PEEK(53279)=C6 THEN TIME(PL)=-C
   1:GOTO 1100
PW 175 POKE 16,112:POKE 53774,112
QH 180 S=STICK(PL):IF S=15 THEN 170
ZC 190 IF  NOT STRIG(PL) THEN 260
YX 195 REM PROCESS MOVE
DE 200 TX=PX+XDIR(S):TY=PY+YDIR(S)
XY 210 LOCATE TX,TY,A:IF A<>32 THEN 170
IO 220 COLOR 32:PLOT PX,PY:PX=TX:PY=TY
AF 230 COLOR 34:PLOT PX,PY
WJ 240 SOUND C0,40,C2,C8:FOR A=C1 TO C10:
   NEXT A:SOUND C0,C0,C0,C0
AO 250 POKE 77,C0:GOTO 170
IH 255 REM HANDLE TRIGGER PRESS
OO 260 OX=PX+XDIR(S):OY=PY+YDIR(S):LOCATE
    OX,OY,A
LD 270 IF A<>C3 AND A<>166 THEN 170
ZS 280 LOCATE OX+XDIR(S),OY+YDIR(S),B
DZ 290 IF B<>32 THEN 500
GI 295 REM SLIDE ROUTINE
KJ 300 IF A=C3 THEN C=C3:GOTO 330
YO 310 FOR A=C0 TO C2:IF XBOX(A)=OX AND Y
   BOX(A)=OY THEN BOX=A
XO 320 NEXT A:C=166
FK 330 B=5
ZK 340 SOUND C0,B*5,C10,C8:B=B+1
CL 350 TX=OX+XDIR(S):TY=OY+YDIR(S)
SW 360 LOCATE TX,TY,A:IF A<>32 THEN 400
FG 370 COLOR 32:PLOT OX,OY:OX=TX:OY=TY
DN 380 COLOR C:PLOT OX,OY
```

```
OM 390 GOTO 340
BY 400 SOUND C0,C0,C0,C0
CE 410 IF C<>166 THEN 170
LG 420 XBOX(BOX)=OX:YBOX(BOX)=OY
DO 425 REM CHECK BOXES
YN 430 IF XBOX(C0)<>XBOX(C1) OR XBOX(C0)<
   >XBOX(C2) THEN 460
UP 440 A=YBOX(C0)-YBOX(C1):B=YBOX(C0)-YBO
   X(C2):C=ABS(A):D=ABS(B)
OZ 450 IF ((C=1 AND D=1) OR A+B=3 OR A+B=
   -3) AND (C<3 AND D<3) THEN 1000
YI 460 IF YBOX(C0)<>YBOX(C1) OR YBOX(C0)<
   >YBOX(C2) THEN 170
RN 470 A=XBOX(C0)-XBOX(C1):B=XBOX(C0)-XBO
   X(C2):C=ABS(A):D=ABS(B)
PF 480 IF ((C=1 AND D=1) OR A+B=3 OR A+B=
   -3) AND (C<3 AND D<3) THEN 1000
PA 490 GOTO 170
QR 495 REM CRUSH ROUTINE
PX 500 IF A=C3 THEN 520
IT 510 SOUND C0,150,C10,C8:FOR A=C1 TO 25
   :NEXT A:SOUND C0,C0,C0,C0:GOTO 170
AA 520 SOUND C0,50,C2,C8:COLOR C4:PLOT OX
   ,OY:FOR A=C1 TO 25:NEXT A
CI 530 SOUND C0,70,C2,C8:COLOR C5:PLOT OX
   ,OY:FOR A=C1 TO 25:NEXT A
XX 540 COLOR 32:PLOT OX,OY
DR 550 SOUND C0,C0,C0,C0:GOTO 170
PA 997 REM BOARD DONE SCREEN
IK 999 REM BOARD END EFFECTS
ZZ 1000 TIME(PL)=PEEK(19)*256+PEEK(20)
LI 1005 FOR A=C8 TO C0 STEP -C1
SB 1010 FOR B=C15 TO C0 STEP -C1
UJ 1020 SOUND C0,B*5,C8,A+C2
CH 1030 SETCOLOR C4,B,A
NK 1040 NEXT B:NEXT A
GS 1050 SETCOLOR C4,C0,C0
YG 1060 SOUND C0,C0,C0,C0
DG 1099 REM BOARD END SCREEN
ZK 1100 GOSUB 2500
GF 1110 POSITION C3,C4:? #C6;"time: ";
JN 1120 B=TIME(PL):GOSUB 2000
ID 1130 POSITION C3,C5:? #C6;"best: ";
DY 1140 B=BEST(BOARD-C1):GOSUB 2000
CK 1150 IF TIME(PL)>B OR TIME(PL)=-1 THEN
    1180
DB 1160 POSITION C4,C8:? #C6;"A NEW RECOR
   D":BEST(BOARD-C1)=TIME(PL)
FT 1170 FOR A=50 TO 150:SOUND C0,A,C10,C8
   :NEXT A:SOUND C0,C0,C0,C0
DN 1180 POSITION C4,11:? #C6;"PRESS BUTTO
   N"
HR 1190 IF STRIG(PL) THEN 1190
ZM 1200 GOSUB 2500
ZF 1210 IF PLAYERS=C2 AND PL=C0 THEN PL=C
   1:GOTO 150
XM 1220 IF PLAYERS=C1 THEN GOTO 120
DH 1230 REM FINAL SCREEN
SK 1240 POSITION C5,C0:? #C6;"GAME  OVER"

RP 1250 POSITION C3,C3:? #C6;"pl.1: ";
OM 1260 B=TIME(C0):GOSUB 2000
TT 1270 POSITION C3,C4:? #C6;"pl.2: ";
PG 1280 B=TIME(C1):GOSUB 2000
RV 1290 POSITION C3,C5:? #C6;"best: ";
DQ 1300 B=BEST(BOARD-C1):GOSUB 2000
OI 1310 POSITION C1,C8
US 1320 IF TIME(C0)=-1 AND TIME(C1)=-1 TH
   EN ? #C6;"  DOUBLE FORFEIT":GOTO 1400
GV 1330 IF TIME(C0)=TIME(C1) THEN ? #C6;"
      IT'S A TIE":GOTO 1400
RR 1340 IF (TIME(C0)<TIME(C1) AND TIME(C0
   )<>-1) OR TIME(C1)=-1 THEN ? #C6;"  PL
   AYER 1 WINS!":GOTO 1360
KG 1350 ? #C6;"  PLAYER 2 WINS!"
XE 1360 POSITION C5,C10
FL 1370 IF TIME(C0)=-1 OR TIME(C1)=-1 THE
   N POSITION C5,C9:? #6;"BY FORFEIT"
ZD 1400 IF STRIG(C0) AND STRIG(C1) THEN 1
   400
OB 1410 GOTO 120
XS 1997 REM ASSORTED ROUTINES
BE 1999 REM TIME CONVERTER (B)
VR 2000 IF B=-C1 THEN ? #C6;"ABORTED":RET
   URN
OK 2010 MIN=INT(B/3600)
TW 2020 SEC=INT((B-3600*MIN)/60)
CV 2030 TEN=INT((B-(MIN*3600+SEC*60))/0.6
   )
NU 2040 IF MIN<C10 THEN ? #C6;"0";
LS 2050 ? #C6;MIN;":";
JX 2060 IF SEC<C10 THEN ? #C6;"0";
YY 2070 ? #C6;SEC;".";
PD 2080 IF TEN<C10 THEN ? #C6;"0";
JW 2090 ? #C6;TEN
AC 2100 RETURN
AE 2499 REM SCREEN CLEARER
KQ 2500 FOR A=C3 TO C0 STEP -C3
RX 2510 FOR B=C1 TO C10
KU 2520 COLOR A:PLOT C1,B:DRAWTO 18,B
NS 2530 NEXT B:NEXT A
AW 2540 RETURN
SW 4998 REM LEVEL INITIALIZATION
HT 5000 GRAPHICS 18:POKE 756,CHSET/256
FL 5010 POKE 708,56:POKE 709,C0:POKE 711,
   28
RI 5020 COLOR 141:PLOT C1,C0:DRAWTO 18,C0
   :PLOT C1,11:DRAWTO 18,11
EK 5030 COLOR 136:PLOT C0,C1:DRAWTO C0,C1
   0:PLOT 19,C1:DRAWTO 19,C10
FA 5040 COLOR 137:PLOT C0,C0:COLOR 138:PL
   OT 19,C0:COLOR 139:PLOT C0,11:COLOR 14
   0:PLOT 19,11
RC 5050 COLOR C3:ON BOARD GOSUB 5700,5800
   ,5900
SY 5060 IF PL THEN 5121
BV 5070 A=INT(RND(C0)*C5+C2):B=INT(RND(C0
   )*C8+C2):LOCATE A,B,C:IF C=32 THEN 507
   0
LR 5080 XBO(C0)=A:YBO(C0)=B
NL 5090 A=INT(RND(C0)*C5+C8):B=INT(RND(C0
   )*C8+C2):LOCATE A,B,C:IF C=32 THEN 509
   0
MB 5100 XBO(C1)=A:YBO(C1)=B
XR 5110 A=INT(RND(C0)*C4+14):B=INT(RND(C0
   )*C8+C2):LOCATE A,B,C:IF C=32 THEN 511
   0
NN 5120 XBO(C2)=A:YBO(C2)=B
XG 5121 FOR A=C0 TO C2:XBOX(A)=XBO(A):YBO
   X(A)=YBO(A):NEXT A
FI 5130 POSITION C6,C0:? #6;"PLAYER ";PL+
   1
LE 5135 FOR A=1 TO 100:NEXT A
KJ 5140 IF  NOT PL THEN C=7:GOTO 5160
LT 5150 C=12
BW 5160 FOR A=0 TO 8:SETCOLOR 1,C,A:FOR B
   =1 TO 10:NEXT B:NEXT A:FOR B=C1 TO 100
   :NEXT B
CY 5170 COLOR 166
DN 5180 FOR A=C0 TO C2:PLOT XBOX(A),YBOX(
   A):FOR B=C15 TO C0 STEP -C1:SOUND C0,5
   0,C10,B:NEXT B:C=C^C1:NEXT A
ZZ 5190 POSITION C4,11:? #6;"PRESS BUTTON
   "
CN 5200 IF STRIG(PL) THEN 5200
MH 5202 COLOR 141:PLOT C1,11:DRAWTO 18,11

DQ 5210 PX=C9:PY=C6:COLOR 34:PLOT PX,PY
MC 5230 RESTORE 5250:FOR A=C0 TO 18:READ
   B:SOUND C0,B,C10,C15:FOR B=C0 TO C5:NE
   XT B:NEXT A
AT 5240 RETURN
PK 5245 REM MUSIC DATA
TG 5250 DATA 85,0,64,0,50,0,42,0,0,50,0,4
   2,42,42,42,42,42,42,0
DA 5699 REM BOARD 1
HM 5700 PLOT C8,C4:DRAWTO 11,C4:DRAWTO 11
   ,C7:DRAWTO C8,C7:DRAWTO C8,C4
TD 5710 PLOT C8,C2:DRAWTO C2,C2:DRAWTO C2
   ,C9:DRAWTO C8,C9
HY 5720 PLOT 11,C2:DRAWTO 17,C2:DRAWTO 17
   ,C9:DRAWTO 11,C9
PX 5730 PLOT C5,C8:DRAWTO C5,C5:DRAWTO C7
   ,C5:PLOT 14,C3:DRAWTO 14,C6:DRAWTO 12,
   C6
DK 5740 PLOT C3,C3:PLOT 16,C8:PLOT C1,C8:
   PLOT 18,C3
BG 5750 RETURN
DS 5799 REM BOARD 2
KC 5800 PLOT C4,C1:PLOT C5,C3:PLOT C5,C2:
   DRAWTO C2,C2:DRAWTO C2,C9:DRAWTO C4,C9
   :DRAWTO C4,C6:DRAWTO C8,C6
IR 5810 PLOT C10,C6:PLOT 11,C6:DRAWTO 11,
   C4:DRAWTO 14,C4:DRAWTO 14,C2:PLOT 13,C
   5:DRAWTO C15,C5:DRAWTO C15,C10
SE 5820 DRAWTO C6,C10:PLOT C10,C9:PLOT 13
   ,C7:PLOT 13,C8:DRAWTO C6,C8:PLOT 16,C7
```

continued on next page

```
   :PLOT 17,C7:DRAWTO 17,C9:PLOT C9,C3
EX 5830 PLOT 12,C1:PLOT 12,C2:DRAWTO C7,C
   2:PLOT C9,C4:DRAWTO C3,C4:PLOT 18,C1
KC 5840 DRAWTO 16,C1:DRAWTO 16,C3:PLOT 17
   ,C3:DRAWTO 17,C5
BI 5850 RETURN
EK 5899 REM BOARD 3
EL 5900 FOR A=C1 TO C10:PLOT C1,A:DRAWTO
   18,A:NEXT A:COLOR 32
YS 5910 PLOT C1,C1:DRAWTO 18,C1:DRAWTO 18
   ,C10:DRAWTO C1,C10:DRAWTO C1,C1
OF 5920 PLOT C9,C2:DRAWTO C9,C5:DRAWTO 17
   ,C5
OW 5930 PLOT C2,C6:DRAWTO C10,C6:DRAWTO C
   10,C9
JM 5940 PLOT C2,C2:PLOT 17,C2:PLOT C2,C9:
   PLOT 17,C9
BK 5950 RETURN
CP 6998 REM TITLE SCREEN, ETC.
HF 7000 GRAPHICS 17:POKE 756,CHSET/256
IW 7010 DL=PEEK(560)+PEEK(561)*256
FG 7020 POKE DL+C9,C7:POKE DL+28,C0
YR 7030 POKE 708,40:POKE 709,88
XN 7040 POKE 711,202
AE 7050 POSITION C3,C3:? #C6;"james   hagu
   e's"
YC 7060 FOR A=C1 TO 100:NEXT A
LD 7070 POSITION C5,C4:? #C6;"ROCKSLIDE!!"
ZA 7080 POSITION C3,C5:? #C6;"COPYRIGHT 1
   986"
PW 7090 COLOR 141:PLOT C1,C2:DRAWTO 18,C2
   :PLOT C1,C6:DRAWTO 18,C6
JT 7100 COLOR 136:PLOT C1,C3:DRAWTO C1,C5
   :PLOT 18,C3:DRAWTO 18,C5
PB 7105 COLOR 137:PLOT C1,C2:COLOR 138:PL
   OT 18,C2:COLOR 139:PLOT C1,C6:COLOR 14
   0:PLOT 18,C6
LH 7110 POSITION C1,13:? #C6;"option for
   board"
RO 7120 POSITION C2,14:? #C6;"select for
   players"
DV 7130 POSITION C3,C15:? #C6;"start to b
   egin"
CR 7140 POSITION C5,17:? #C6;"best times"
OU 7150 FOR A=C0 TO C2:POSITION C1,18+A:?
   #C6;">board ";A+C1;": ";
UU 7160 B=BEST(A):GOSUB 2000:NEXT A
ZQ 7170 POSITION C5,C10:? #C6;"PLAYERS: "
   ;PLAYERS
NC 7180 POSITION C5,C9:? #C6;"BOARD   : ";
   BOARD
AJ 7185 FOR A=C1 TO 25:NEXT A
XJ 7190 IF PEEK(53279)=C6 OR  NOT STRIG(0
   ) THEN RETURN
ZT 7200 IF PEEK(53279)<>C5 THEN 7220
ZN 7210 PLAYERS=PLAYERS+C1:IF PLAYERS=C3
   THEN PLAYERS=C1
AR 7220 IF PEEK(53279)<>C3 THEN 7240
RE 7230 BOARD=BOARD+C1:IF BOARD=C4 THEN B
   OARD=C1
TX 7240 GOTO 7170
LE 9998 REM MAIN INITIALIZATION
UJ 10000 DIM XDIR(15),YDIR(15),XBOX(2),YB
   OX(2),TIME(1),BEST(2),XBO(2),YBO(2)
JW 10010 RESTORE 10110:READ C0,C1,C2,C3,C
   4,C5,C6,C7,C8,C9,C10,C15
AD 10020 PLAYERS=C2:BOARD=C1:BEST(C0)=360
   0:BEST(C1)=3600:BEST(C2)=3600
RD 10030 FOR A=C1 TO C15:READ B:XDIR(A)=B
   :NEXT A
SL 10040 FOR A=C1 TO C15:READ B:YDIR(A)=B
   :NEXT A
KR 10050 FOR A=C0 TO C15:READ B:POKE 1664
   +A,B:NEXT A:A=USR(1664)
DV 10060 RETURN
EH 10100 REM CONSTANTS
OD 10110 DATA 0,1,2,3,4,5,6,7,8,9,10,15
QL 10120 REM X & Y OFFSETS
RF 10130 DATA 0,0,0,0,0,0,1,0,0,0,-1,0,0,
   0,0
RV 10140 DATA 0,0,0,0,0,0,0,0,0,0,0,0,1,-
   1,0
UW 10150 REM VBI FLASH ROUTINE
RR 10160 DATA 104,162,6,160,138,169,7,76
IK 10170 DATA 92,228,238,198,2,76,98,228
VA 14998 REM REDEFINE CHARACTERS
LI 15000 CHI=CHSET/256:CLO=0:POKE 203,CLO
   :POKE 204,CHI
AE 15010 DIM XFR$(28)
LZ 15020 XFR$="h[illegible]"
RQ 15040 XFR=USR(ADR(XFR$))
OL 15050 RESTORE 15090
FY 15060 READ A:IF A=-1 THEN RETURN
QR 15070 FOR Z=0 TO 7:READ J:POKE CHSET+A
   *8+Z,J:NEXT Z
CV 15080 GOTO 15060
OF 15100 DATA 2,60,126,219,219,255,102,12
   6,231
SV 15110 DATA 3,0,124,254,254,254,254,254
   ,124
SM 15120 DATA 4,0,0,56,124,124,124,56,0
GB 15130 DATA 5,0,0,0,56,56,56,0,0
HY 15140 DATA 6,0,56,124,238,198,238,124,
   56
MP 15150 DATA 13,0,0,255,255,255,255,0,0
WE 15160 DATA 8,60,60,60,60,60,60,60,60
XM 15170 DATA 9,0,0,31,63,63,63,62,60
DR 15180 DATA 10,0,0,248,252,252,252,124,
   60
YD 15190 DATA 11,60,62,63,63,63,31,0,0
XW 15200 DATA 12,60,124,252,252,252,248,0
   ,0
FC 15210 DATA -1
```

ST RESOURCE

PERSONAL PASCAL

Article on page 64

LISTING 1

```
PROGRAM CountLines;
{Sample Personal Pascal application to count the number of lines in}
{ a text file chosen by the user with the GEM Item Selector dialog.}
{ By Christopher F. Chabris for ANTIC Magazine, 26-27 January 1986.}

CONST
 {$I GEMCONST.PAS}
```

```
TYPE
 {$I GEMTYPE.PAS}
 tftype = FILE of TEXT;

VAR
 pathname,filename : Path_Name;
 selection : boolean;


{$I GEMSUBS.PAS}


PROCEDURE ItoS (int : integer; VAR inttext : string);
{Generic procedure to convert integers to strings, packs front with zeros.}
VAR
 place,digit : integer;

BEGIN
 FOR place:=4 DOWNTO 0 DO
  BEGIN
   digit:=int DIV Round(PwrOfTen(place));
   inttext[5-place]:=Chr(digit+Ord('0'));
   int:=int MOD Round(PwrOfTen(place));
  END;
END; {ItoS}


PROCEDURE Count (filename : Path_Name);
{Count lines in file by reading lines until end-of-file condition.  Report}
{ the total in alert box.  (Change mouse to bee while I/O is in progress!)}

VAR
 textfile : tftype;
 linecount,index,dummy : integer;
 lcstring,alerttext : string;

BEGIN
 Set_Mouse(M_Bee);
 reset(textfile,filename);
 linecount:=0;
 WHILE (not eof(textfile)) DO
  BEGIN
   readln(textfile);
   linecount:=linecount+1;
  END;
 close(textfile);
 ItoS(linecount,lcstring);
 alerttext:='[1][File contains:|          |lines of text.][ OK ]';
 FOR index:=1 TO 5 DO
  alerttext[index+23]:=lcstring[index];
 Set_Mouse(M_Arrow);
 dummy:=Do_Alert(alerttext,1);
END; {Count}



BEGIN {Main Module}
 IF Init_Gem>=0 THEN
  BEGIN
   pathname:='A:\*.*';
   selection:=true;
   REPEAT
    selection:=Get_In_File(pathname,filename);
    IF selection THEN Count(filename);
   UNTIL selection=false;
   Exit_Gem;
  END;
END. {CountLines}
```

JOYSTICK ST

Article on page 52

LISTING 1

```
/*
 * Joystick Demonstration Program>
 * (c) 1986 Antic Publishing
 * Ver. 013086
 * Written By Patrick Bass
 *
 *  The purpose of this program is to demonstrate
 *  accessing the joystick port on the 520ST.
 *
 *-----------------------------------*/

#include        "osbind.h"

#define    CON      2
#define    IKBD     4
#define    CR       0x0d
#define    LF       0x0a
#define    TRUE     (1)
#define    FALSE    (0)
#define    not      !
#define    nothing

char     joyrec[ 3 ], stick0, stick1;
static char mousedata[]={ 0,0,1,1 };

int   contrl[ 12 ],
      intin[ 128 ], ptsin[ 128 ],
      intout[ 128 ], ptsout[ 128 ],
      work_in[]={ 1,1,1,1,1,1,1,1,1,1,2 }, work_out[ 57 ],
      handle, i, j, k, l,
      flagged, active;

int   joystick();

struct   ikbdvbase
         {
         long     midivec;
         long     vkbderr;
         long     vmiderr;
         long     statvec;
         long     mousevec;
         long     clockvec;
         long     joyvec;
         long     midisys;
         long     ikbdsys;
         };

struct   ikbdvbase
            savesys, *kbase;

/*-----------------------------------*/
main()
{
      initialize();

      do{
            stick0=stick( 0 );
            stick1=stick( 1 );
            Cconws( " Stick zero is: " ); Pbyte( stick0 );
            Cconws( "                 " );
```

```
        Cconws( " Stick  One is: " ); Pbyte( stick1 );
        Bconout( CON, CR );

    }while( active );

    terminate();
}

/*---------------------------------*/
initialize()
{
    appl_init();
    handle=graf_handle( &i, &j, &k, &l );
    v_opnvwk( work_in, &handle, work_out );

    kbase=Kbdvbase();

    savesys.midivec=kbase->midivec;
    savesys.vkbderr=kbase->vkbderr;
    savesys.vmiderr=kbase->vmiderr;
    savesys.statvec=kbase->statvec;
    savesys.mousevec=kbase->mousevec;
    savesys.clockvec=kbase->clockvec;
    savesys.joyvec=kbase->joyvec;
    savesys.midisys=kbase->midisys;
    savesys.ikbdsys=kbase->ikbdsys;

    kbase->joyvec= &joystick;
    Bconout( IKBD, 0x15 );

    active=TRUE;
    flagged=FALSE;
}

/*---------------------------------*/
terminate()
{
    Bconout( IKBD, 0x1a );
    kbase->joyvec=savesys.joyvec;

    Initmous( 1, &mousedata, kbase->mousevec );

    v_clsvwk(handle);
    appl_exit();
}

/*---------------------------------*/
stick( which )
int  which;
{
    char state;

    Bconout( IKBD, 0x16 );
    do{ nothing; }while( not flagged );

    flagged=FALSE;

    if( joyrec[ 1 ] & 0x80 ) active=FALSE;

    state=joyrec[ which ];
    return( state );
}

/*---------------------------------*/
joystick( buffer )
char    buffer[ 3 ];
{
    if( not flagged ){
        for ( i=0; i<2; i++ ) joyrec[ i ]=buffer[ i ];
        flagged=TRUE;
    }
}

/*---------------------------------*/
```

continued on next page

```
Pbyte( value )
char    value;
{
     Pdigit( value>>4 );
     Pdigit( value );
}

/*--------------------------------*/
Pdigit( value )
char     value;
{
     value=value&0x0f;
     if( value >= 0x0a ) value=value+0x07;
     value=value+0x30;
     Bconout( CON, value  );
}
```

LISTING 2

```
/*
 * Atari 520ST PONG
 * (c) 1986 Antic Publishing
 * Ver. 012786/10:00a
 * Written by Patrick Bass
 *
 * The purpose of this program is to give
 * a practical demonstration of joystick access.
 *
 *----- Alcyon Include File ------------*/
#include        "osbind.h"

#define    CON       2
#define    IKBD      4
#define    CR        0x0d
#define    LF        0x0a
#define    not       !
#define    equals    ==
#define    begin     {
#define    end       }
#define    endif     }
#define    next      }
#define    BREAKOUT  2
#define    AND       &&
#define    TRUE      1
#define    FALSE     0
#define    WHITE     0
#define    BLACK     1

char       packet[ 3 ], stick0, stick1,
           welcome[]="[1][ AnticPong | (c) 1986 Antic Publishing ][ Go ]",
           talert[]="[3][ Desired type of game? ][ Handball | Breakout ]",
           mdata[]={ 0,0,1,1 };

int        contrl[ 12 ],
           intin[ 128 ], ptsin[ 128 ],
           intout[ 128 ], ptsout[ 128 ],
           work_in[]={ 1,1,1,1,1,1,1,1,1,1,2 }, work_out[ 57 ],

           handle, i, j, k, l, flag, button, finished,
           resolution, di, joypress, pel, type_game,
           ox, oy, nx, ny, gamego, port_state,
           opx, opy, px, py, pw, ph, pvel,
           zw, zh, maxrow, maxcol,
           ball,
           oballx, obally,
           ballx, bally, ballw, ballh,
           ballxvel, ballyvel,
           xres, yres, maxcolor,
           pxyarray[ 10 ],
           blkrow[ 15*32 ], blkcol[ 15*32 ],
           benable[ 15*32 ];

int        joystick();
```

```
struct   ikbdvbase
         {
         long      midivec;
         long      vkbderr;
         long      vmiderr;
         long      statvec;
         long      mousevec;
         long      clockvec;
         long      joyvec;
         long      midisys;
         long      ikbdsys;
         };

struct   ikbdvbase
           savesys,
           *kbdvbase;


/*--------------------------------------*/
main()
begin
      initialize();

      do{ pong(); }while ( not finished );

      terminate();
end

/*--------------------------------------*/
initialize()
begin
      appl_init();
      handle=graf_handle( &i, &j, &k, &l );
      v_opnvwk( work_in, &handle, work_out );
      xres=work_out[ 0 ];
      yres=work_out[ 1 ];
      maxcolor=work_out[ 13 ];
      form_alert( 1, welcome );
      for( i=0; i<10000; i++ );
      type_game=form_alert( 1, talert );
      v_hide_c( handle );

      kbdvbase=Kbdvbase();

      savesys.midivec=kbdvbase->midivec;
      savesys.vkbderr=kbdvbase->vkbderr;
      savesys.vmiderr=kbdvbase->vmiderr;
      savesys.statvec=kbdvbase->statvec;
      savesys.mousevec=kbdvbase->mousevec;
      savesys.clockvec=kbdvbase->clockvec;
      savesys.joyvec=kbdvbase->joyvec;
      savesys.midisys=kbdvbase->midisys;
      savesys.ikbdsys=kbdvbase->ikbdsys;

      kbdvbase->joyvec= &joystick;
      Bconout( IKBD, 0x15 );

      resolution=Getrez();

      button=TRUE;
      finished=FALSE;
      flag=TRUE;

      opx=px=(xres/2);
      opy=py=(yres-(yres/10));
      pw=(xres/20);
      ph=(yres/60);
      pvel=4;

      oballx=ballx=(xres/2);
      obally=bally=(yres/2);
      zw=(xres/20);
      zh=(yres/60);
```

continued on next page

```
        if( resolution equals 0 ) begin
              maxrow=7; maxcol=11;
              ballw=2; ballh=2;
              ballxvel=2; ballyvel=(-1);
        endif

        if( resolution equals 1 ) begin
              maxrow=7; maxcol=15;
              ballw=2; ballh=2;
              ballxvel=2; ballyvel=(-1);
        endif

        if( resolution equals 2 ) begin
              maxrow=7; maxcol=15;
              ballw=3; ballh=3;
              ballxvel=3; ballyvel=(-2);
        endif

        for( i=0; i<(15*32); benable[ i++ ]=FALSE );

end

/*-------------------------------------*/
terminate()
begin
        Bconout( IKBD, 0x1a );
        kbdvbase->joyvec=savesys.joyvec;

        Initmous( 1, &mdata, kbdvbase->mousevec );

        v_show_c( handle, 0 );
        v_clsvwk( handle );
        appl_exit();
end

/*-------------------------------------*/
pong()
begin
        draw_board();
        if( type_game equals BREAKOUT ) draw_field();

        for( ball=1; ball<6; ) begin
              move_paddle();
              draw_paddle();
              check_for_block();
              move_ball();
              draw_ball();
        next

        finished=TRUE;
end
/*-------------------------------------*/
draw_board()
begin
        int  box[4];

        box[ 0 ]=0; box[ 1 ]=0;
        box[ 2 ]=xres; box[ 3 ]=yres;
        vsf_interior( handle, 2 );
        vsf_style( handle, 8 );
        vsf_color( handle, WHITE );
        v_bar( handle, box );

        box[ 0 ]=10; box[ 1 ]=10;
        box[ 2 ]=xres-10; box[ 3 ]=yres;
        vsf_color( handle, BLACK );
        v_bar( handle, box );
end
```

```
/*--------------------------------------*/
move_paddle()
begin
      joypress=stick( 1 );

      if( joypress&0x01 ) py=py-pvel;
      if( joypress&0x02 ) py=py+pvel;
      if( joypress&0x04 ) px=px-pvel;
      if( joypress&0x08 ) px=px+pvel;

      if( px<=10 ) px=10;
      if( px>=(xres-10-pw)) px=(xres-10-pw);
      if( py<=(yres/2) ) py=(yres/2);
      if( py>=( yres-ph )) py=( yres-ph );
end

/*--------------------------------------*/
draw_paddle()
begin
      int  box[4];

      box[ 0 ]=opx; box[ 1 ]=opy;
      box[ 2 ]=opx+pw; box[ 3 ]=opy+ph;
      vsf_interior( handle, 2 );
      vsf_style( handle, 8 );
      vsf_color( handle, BLACK );
      v_bar( handle, box );

      box[ 0 ]=px; box[ 1 ]=py;
      box[ 2 ]=px+pw; box[ 3 ]=py+ph;
      vsf_color( handle, WHITE );
      v_bar( handle, box );

      opx=px; opy=py;
end

/*--------------------------------------*/
move_ball()
begin
      ballx=ballx+ballxvel;
      bally=bally+ballyvel;

      if( (ballx>=px) AND (ballx<=(px+pw))) begin
           if( (bally>=py) AND ( bally<=(py+ph))) begin
                 beep( 3 );
                 ballyvel=(-ballyvel);
           endif
      endif

      if( ballx<=10 ) begin
           ballx=10;
           ballxvel=(-ballxvel);
           beep( 1 );
      endif

      if( ballx>=(xres-ballw-10)) begin
           ballx=(xres-ballw-10);
           ballxvel=(-ballxvel);
           beep( 1 );
      endif

      if( bally<=10 ) begin
           bally=10;
           ballyvel=(-ballyvel);
           beep( 2 );
      endif

      if( bally>=yres ) begin
           ball=ball+1;
           ballx=(xres/2); bally=(yres/2);
           for( i=0; i<25; i++ ) begin
                beep( i/2 );
           next
      endif
end
```

continued on next page

```
/*--------------------------------------*/
draw_ball()
begin
      int   box[4];

      box[ 0 ]=oballx; box[ 1 ]=obally;
      box[ 2 ]=oballx+ballw; box[ 3 ]=obally+ballh;
      vsf_interior( handle, 2 );
      vsf_style( handle, 8 );
      vsf_color( handle, BLACK );
      v_bar( handle, box );

      box[ 0 ]=ballx; box[ 1 ]=bally;
      box[ 2 ]=ballx+ballw; box[ 3 ]=bally+ballh;
      vsf_color( handle, WHITE );
      v_bar( handle, box );

      oballx=ballx; obally=bally;
end
/*--------------------------------------*/
draw_field()
begin
      int   row, col, color;
      for( row=0; row<maxrow; row++ ) begin
            for( col=0; col<maxcol; col++ ) begin
                  color=row;
                  if((resolution equals 0) AND (color equals 1)) color=5;

                  if( resolution equals 1 ) begin
                        color=row&3;
                        if( color equals 1 ) color=2;
                  endif

                  if( resolution equals 2 ) color=0;

                  blkrow[ (row*maxcol)+col ]=row*(zh+5)+20;
                  blkcol[ (row*maxcol)+col ]=col*(zw+10)+18;
                  benable[ (row*maxcol)+col ]=TRUE;

                  draw_block( col*(zw+10)+18, row*(zh+5)+20, color );
            next
      next
end

/*--------------------------------------*/
draw_block( zx, zy, zc )
int   zx, zy, zc;
begin
      int   box[4];

      box[ 0 ]=zx; box[ 1 ]=zy;
      box[ 2 ]=zx+zw; box[ 3 ]=zy+zh;
      vsf_interior( handle, 2 );
      vsf_style( handle, 8 );
      vsf_color( handle, zc );
      v_bar( handle, box );
end
/*--------------------------------------*/
check_for_block()
begin
      int   row, col, zx, zy;

      for( row=0; row<maxrow; row++ ) begin
            for( col=0; col<maxcol; col++ ) begin

                  zy=blkrow[ (row*maxcol)+col ];
                  zx=blkcol[ (row*maxcol)+col ];

                  if( (ballx>=zx) AND (ballx<=(zx+zw))) begin
                        if( (bally>=zy) AND ( bally<=(zy+zh))) begin
                              if( benable[(row*maxcol)+col] equals TRUE) begin
                                    ballyvel=(-ballyvel);
                                    draw_block( zx, zy, 1 );
```

```
                                        benable[ (row*maxcol)+col ]=FALSE;
                                        beep( 4 );
                                        block_replace();
                                endif
                        endif
                endif
        next
    next
end

/*-----------------------------------------------*/
block_replace()
begin
    int  row, col, found;

    found=FALSE;

    for( row=0; row<maxrow; row++ ) begin
        for( col=0; col<maxcol; col++ ) begin

            if( benable[(row*maxcol)+col] equals TRUE) found=TRUE;

        next
    next

    if( not found ) draw_field();

end

/*----------------------------------------*/
stick( which )
int  which;
begin
    char press;

    Bconout( IKBD, 0x16 );
    do(  ;)while ( flag );

    flag=TRUE;
    press=packet[ which ];
    return( press );
end


/*----------------------------------*/
beep( note )

char note;
begin
    int  delay;

    Giaccess( 15, 8+128 );
    Giaccess( 0, 0+128 );
    port_state=Giaccess( port_state, 7 );
    Giaccess( 60, 7+128 );

    Giaccess( note, 1+128 );
    for( delay=0; delay<4000; delay++ );
    Giaccess( 0, 1+128 );

    Giaccess( port_state, 7+128 );
    Giaccess( 0, 8+128 );
end


/*----------------------------------------*/
joystick( buffer )
char    buffer[ 3 ];
begin
    if( flag ) begin
        for( i=0; i<3; i++ ) packet[ i ]=buffer[ i ];
        flag=FALSE;
    endif
end
```

ST BASIC DISK I/O

Article on page 78

```
100     'Random I/O Files in ST BASIC
110     'ver. 011386
120     'Written by David Stambaugh
130     '(c)1986 Antic Publishing
140     '
150     DISK=1: OUTPUT=2
160     TRUE=(-1): FALSE=0
170     clearw OUTPUT: fullw OUTPUT
180     '
190     open "R",#DISK,"a:\TEST.DAT",35
200     field #DISK, 10 AS PHONE$, 25 AS PERSONAL$
210     print:gotoxy 0,5
220     input "How many records to store > ";COUNT%
230     '
240     for RECORD=1 to COUNT%
250       clearw OUTPUT: gotoxy 10,0
260       print "Input For Record Number ";RECORD;" of ";COUNT%
270       gotoxy 0,5:input "NAME:",B$
280       gotoxy 0,10:input "PHONE:",A$
290       lset PHONE$=A$: lset PERSONAL$=B$
300       gotoxy 10,15:print "Please Wait. Writing data to file."
310       put #DISK, RECORD
320     next RECORD
330     close #DISK
340     '- - - - - - - - - - - - - - - - - - - - - - - -
350     ATTEMPT=TRUE
360     open "R",#DISK,"a:\TEST.DAT",35
370     '
380     while ATTEMPT=TRUE
390       A$="          ": 'Ten Spaces
400       B$="                         ": 'Twenty-Five Spaces
410       clearw OUTPUT: gotoxy 0,0
420       CHOICE%=FALSE: input "( 0=end ) Look at file number ";CHOICE%
430       if CHOICE% then gosub READRECORD else ATTEMPT=FALSE
440     wend
450     '
460     close #DISK
470     clearw OUTPUT
480     '
490     end
500     '-------------------------------------
510     '
520     READRECORD:
530     if CHOICE%>COUNT% then return
540     field #DISK, 10 AS PHONE$, 25 AS PERSONAL$
550     get #DISK, CHOICE%
560     lset A$=PHONE$: lset B$=PERSONAL$
570     gotoxy 0,4: print "Name > ";B$
580     gotoxy 0,8: print "Phone > ";A$
590     for delay=0 to 2000: next delay
600     return
```

chemists' anti-drudgery tool

MOLECULAR WEIGHT CALCULATOR

Article on page 42

LISTING 1

Don't type the TYPO II Codes!

```
DF 10 REM MWCALC
IY 20 REM BY JIM PIERSON-PERRY
FW 30 REM (c) 1985, ANTIC PUBLISHING
TE 2500 GOTO 8700
BN 2900 SUB=C1:P2=P1
OT 3000 IF P1>N THEN RETURN
TK 3100 IF ASC(F$(P1,P1))<48 OR ASC(F$(P1
   ,P1))>57 THEN RETURN
OD 3200 P2=P2+C1
KG 3300 IF P2>N THEN 3600
SD 3400 IF ASC(F$(P2,P2))<48 OR ASC(F$(P2
   ,P2))>57 THEN 3600
OU 3500 GOTO 3200
PH 3600 P2=P2-C1
AT 3700 SUB=VAL(F$(P1,P2))
OI 3800 P1=P2+C1
AT 3900 RETURN
IP 4200 IF P1=N THEN 4400
ZQ 4300 IF ASC(F$(P1+C1,P1+C1))>96 AND AS
   C(F$(P1+C1,P1+C1))<123 THEN P2=P1+C1
BI 4400 E$=F$(P1,P2)
FT 4500 IF P2=P1 THEN E$(2,2)=NULL1$
MR 4600 FOR ATNUM=C1 TO 205 STEP C2
JY 4700 IF E$(C1,C1)<>SYM$(ATNUM,ATNUM) T
   HEN 5000
HY 4900 IF E$(C2,C2)=SYM$(ATNUM+C1,ATNUM+
   C1) THEN POP :ATNUM=(ATNUM+1)/C2:RETUR
   N
NI 5000 NEXT ATNUM
BO 5200 ERR=C2:RETURN
IV 5600 IF RFLAG THEN ERR=C3:RETURN
OI 5700 P1=P2+C1
YC 5800 IF P1>N-C3 THEN ERR=C3:RETURN
WM 5900 RFLAG=C1:RTEMP=C0
AE 6000 RETURN
TI 6500 IF  NOT RFLAG THEN ERR=C3:RETURN
NA 6600 RFLAG=C0:P1=P2+C1
CB 6700 GOSUB 2900
EQ 6800 FOR I=1 TO LASTSYM
RD 6900 IF ECOMP(I,C3)=-C1 THEN ECOMP(I,C
   3)=SUB
EV 7000 NEXT I
QN 7100 IF HFLAG THEN HTEMP=HTEMP+SUB*RTE
   MP:RETURN
CW 7200 MW=MW+SUB*RTEMP
AL 7300 RETURN
DR 7800 IF HFLAG THEN ERR=C1:RETURN
OO 7900 P1=P2+C1
PU 8000 IF P1>N THEN ERR=C1:RETURN
NX 8100 HFLAG=C1:HTEMP=C0
BT 8200 GOSUB 2900
JY 8300 HSUB=SUB
AO 8400 RETURN
AC 8700 DIM F$(40),E$(2),SYM$(206),A$(1),
   NULL1$(1),WT(103),ECOMP(40,4)
VU 8800 SYM$(1,51)="H HeLiBeB C N O F NeN
   aMgAlSiP S ClArK CaScTiV CrMnF"
SG 8840 SYM$(52,102)="eCoNiCuZnGaGeAsSeBr
   KrRbSrY ZrNbMoTcRuRhPdAgCdInSnSb"
RB 8860 SYM$(103,153)="TeI XeCsBaLaCePrNd
   PmSmEuGdTbDyHoErTmYbLuHfTaW ReOsI"
ZX 9000 SYM$(154,206)="rPtAuHgTlPbBiPoAtR
   nFrRaAcThPaU NpPuAmCmBkCfEsFmMdNoLw"
II 9100 C0=0:C1=1:C2=2:C3=3:NULL1$(C1)="
   "
TU 9200 PRINT "↖":SETCOLOR C2,13,C2:SETCO
   LOR C1,13,12:POKE 752,C1
ZG 9300 POSITION 16,5:PRINT " MWCALC "
LQ 9400 POSITION 6,7:PRINT "Molecular Wei
   ght Calculation"
CN 9500 POSITION 19,10:PRINT "by":POSITIO
   N 11,12:PRINT "Jim Pierson-Perry"
FD 9600 POSITION 13,14:? :FOR I=C1 TO 300
   :NEXT I
YA 9700 POSITION C3,20:PRINT " Initializi
   ng     Please Stand By..."
ID 9800 FOR I=C1 TO 103:READ X:WT(I)=X:NE
   XT I
LC 9900 FOR I=1 TO 40:FOR J=1 TO 4:ECOMP(
   I,J)=0:NEXT J:NEXT I
FK 10000 PRINT "↖"
BI 10100 POSITION 5,C0:PRINT " MOLECULAR 
   WEIGHT CALCULATION "
GO 10200 POSITION C0,C3:PRINT "Type in ch
   emical formula then RETURN."
LM 10300 POSITION C0,4:PRINT "Be sure to
   use correct upper/lower case"
IY 10400 POSITION C2,5:PRINT "letters as
   needed for element symbols."
VY 10500 POKE 752,1
XZ 10600 F$="":ERR=0
CS 10700 POSITION C0,10:PRINT "Enter Form
   ula:":POKE 752,0
KU 10800 INPUT F$
WK 10900 POKE 752,1
XI 11000 N=LEN(F$)
QA 11200 IF N<C1 THEN POSITION C0,15:PRIN
   T "TRY AGAIN.":FOR I=C1 TO 300:NEXT I:
   GOTO 10000
KK 11400 IF N<40 THEN 11700
VC 11500 POSITION C0,15:PRINT "FORMULA TO
   O LONG.  TRY AGAIN.":PRINT "(MAXIMUM =
    39 CHARACTERS)"
UM 11600 FOR I=C1 TO 500:NEXT I:GOTO 1000
   0
WP 11700 P1=C1:P2=P1:MW=C0:RTEMP=C0:HTEMP
   =C0:HSUB=C0:RFLAG=C0:HFLAG=C0:LASTSYM=
   0
ZS 11900 IF P1>N THEN 15200
OV 12000 P2=P1
GN 12100 S1=ASC(F$(P1,P1))
XR 12300 IF S1=40 OR S1=91 THEN GOSUB 560
   0:GOTO 14900
AE 12500 IF S1=41 OR S1=93 THEN GOSUB 650
   0:GOTO 14900
FA 12700 IF S1=42 OR S1=46 THEN GOSUB 780
   0:GOTO 14900
QF 13000 IF S1<65 OR S1>90 THEN ERR=C1:GO
   SUB 19800:GOTO 10000
CN 13200 GOSUB 4200:IF ERR<>C0 THEN GOSUB
    19800:GOTO 10000
VZ 13400 P1=P2+1:GOSUB 2900
HO 13600 LASTSYM=LASTSYM+C1
MH 13700 ECOMP(LASTSYM,C1)=ATNUM
XR 13800 ECOMP(LASTSYM,C2)=SUB
FK 13900 ECOMP(LASTSYM,C3)=C0-RFLAG
FB 14100 ECOMP(LASTSYM,4)=HSUB
KF 14400 IF RFLAG THEN RTEMP=RTEMP+SUB*WT
   (ATNUM):GOTO 11900
OG 14700 IF HFLAG THEN HTEMP=HTEMP+SUB*WT
   (ATNUM):GOTO 11900
YG 14800 MW=MW+SUB*WT(ATNUM)
WA 14900 IF ERR<>C0 THEN GOSUB 19800:GOTO
    10000
AZ 15000 GOTO 11900
OL 15200 IF RFLAG THEN ERR=C3:GOSUB 19800
   :GOTO 10000
```

continued on next page

```
CL 15300 IF HFLAG THEN MW=MW+HSUB*HTEMP
YF 15600 FOR I=C1 TO LASTSYM
YG 15700 IF ECOMP(I,4)=C0 AND ECOMP(I,C3)
   =C0 THEN 16100
IW 15800 IF ECOMP(I,4)=C0 THEN ECOMP(I,C2
   )=ECOMP(I,C2)*ECOMP(I,C3):GOTO 16100
BL 15900 IF ECOMP(I,C3)=C0 THEN ECOMP(I,C
   2)=ECOMP(I,C2)*ECOMP(I,4):GOTO 16100
OR 16000 ECOMP(I,C2)=ECOMP(I,C2)*ECOMP(I,
   C3)*ECOMP(I,4)
FY 16100 NEXT I
JP 16200 FOR J=C1 TO LASTSYM-C1
JC 16300 IF ECOMP(J,C1)=C0 THEN 16900
XL 16400 FOR I=J+C1 TO LASTSYM
QT 16500 IF ECOMP(I,C1)<>ECOMP(J,C1) THEN
    16800
AR 16600 ECOMP(I,C1)=C0
TP 16700 ECOMP(J,C2)=ECOMP(J,C2)+ECOMP(I,
   C2)
GT 16800 NEXT I
HI 16900 NEXT J
GB 17100 PRINT "↖"
BZ 17200 POSITION 5,C0:PRINT " MOLECULAR 
   WEIGHT CALCULATION "
QM 17300 J=INT(0.5+LEN(F$)/2):POSITION 20
   -J,C2:PRINT F$
DZ 17400 POSITION 6,4:PRINT "MOLECULAR WE
   IGHT = ";MW:IF LASTSYM=1 THEN 19300
EL 17900 K=0:FOR I=C1 TO LASTSYM:IF ECOMP
   (I,C1)<>0 THEN K=K+1:NEXT I:IF K>12 TH
   EN GOSUB 21000:GOTO 19300
TA 18000 POSITION 9,6:PRINT "ELEMENT    %C
   OMPOSITION"
FK 18100 POSITION 9,7:PRINT "=======    ==
   =========="
PZ 18200 K=7
YC 18300 FOR I=C1 TO LASTSYM
DS 18400 IF ECOMP(I,C1)=C0 THEN 19200
IN 18500 K=K+1
QP 18600 PCT=100*ECOMP(I,C2)*WT(ECOMP(I,C
   1))/MW
TV 18700 PCT=INT(1000*PCT)/1000
CB 18800 J=2*ECOMP(I,C1)-1
EZ 18900 POSITION 11,K:PRINT SYM$(J,J+1)
CZ 19000 IF PCT<10 THEN POSITION 23,K:PRI
   NT PCT:GOTO 19200
PK 19100 POSITION 22,K:PRINT PCT
GH 19200 NEXT I
KK 19300 POSITION 6,22:PRINT "Another For
   mula (Y/N)";:INPUT A$
PT 19400 IF A$(C1,C1)="Y" OR A$(C1,C1)="y
   " THEN 10000
NC 19500 POKE 752,C0
YQ 19600 END
LJ 19800 PRINT "▣▣":POSITION C0,17:PRINT
   " ERROR  - ";
SA 19900 ON ERR GOTO 20000,20100,20200
IQ 20000 PRINT "Illegal Character":GOTO 2
   0300
TX 20100 PRINT "Invalid Element Symbol":G
   OTO 20300
SI 20200 PRINT "Invalid Radical Expressio
   n"
BJ 20300 POSITION P1+2,12:PRINT "↓↑";:IF
   P2>P1 THEN PRINT "↓↑"
CC 20400 POSITION C0,20:PRINT "Press any
   key to re-enter formula"
QH 20500 CLOSE #1
WP 20600 OPEN #1,4,0,"K:"
NH 20700 GET #1,R
QQ 20800 CLOSE #1
DZ 20900 RETURN
YZ 21000 POSITION C0,8:PRINT "TOO MANY DI
   FFERENT ELEMENTS TO PRINT THE ELEMENTA
   L COMPOSITION (MAXIMUM = 12)":RETURN
SM 21100 REM ELEMENT ATOMIC WEIGHT DATA
AV 21200 REM FOR ARRAY WT.  SOURCE IS
GN 21300 REM MERCK INDEX (9TH EDITION).
QQ 21400 DATA 1.008,4.003,6.941,9.012,10.
   810,12.011,14.007,15.999
AY 21405 DATA 18.998,20.179,22.990,24.305
   ,26.982,28.086,30.974
TO 21500 DATA 32.060,35.453,39.948,39.098
   ,40.080,44.956,47.900
IN 21505 DATA 50.941,51.996,54.938,55.847
   ,58.933,58.70,63.546,65.38
ZJ 21600 DATA 69.720,72.590,74.922,78.960
   ,79.904,83.800,85.468
RI 21605 DATA 87.620,88.906,91.220,92.906
   ,95.940,97.000,101.070
LX 21700 DATA 102.906,106.400,107.868,112
   .400,114.820,118.690
SQ 21705 DATA 121.750,127.600,126.905,131
   .300,132.905,137.34,138.906
CO 21800 DATA 140.120,140.908,144.240,145
   .000,150.400,151.960,157.250
IT 21805 DATA 158.925,162.500,164.930,167
   .260,168.934,173.04
DA 21900 DATA 174.970,178.490,180.948,183
   .850,186.207,190.200,192.220
AR 21905 DATA 195.090,196.967,200.590,204
   .370,207.200,208.98
GT 22000 DATA 209.000,210.000,222.000,223
   .000,226.025,227.000,232.038
ZL 22005 DATA 231.036,238.029,237.048,244
   .000,243.000,247.00
ZK 22100 DATA 247.000,251.000,254.000,257
   .000,258.000,255.000,260.000
```

instant hexadecimal/decimal translation

HEX CONVERTER

by BRUCE BRIGDEN

Here's a short BASIC program that quickly converts decimal numbers to hexadecimal—and vice versa. Hex Converter works on all 8-bit computers of any memory size, with disk or cassette.

Type it in, check it with TYPO II, and SAVE a copy. When you RUN the program, a colorful screen appears prompting you to choose a conversion from hex to decimal, or decimal to hex. Press [H] or [D], then type in your number (without $ for hex) and press [RETURN] for an instant conversion. Press [ESC] at any time to switch conversion direction.

Hex Converter can handle very *large* numbers—up to 20 characters in hex and 4.3 billion for decimal. That should be high enough for addresses even in the megabyte Ataris on the horizon!

LISTING 1

Don't type the TYPO II Codes!

```
FB 5 REM HEXCON
ME 6 REM BY BRUCE BRIGDEN
FV 7 REM (c) 1986, ANTIC PUBLISHING
SA 10 GOTO 30
VZ 20 GRAPHICS 18:POKE 712,10:POKE 711,19
   6:POKE 710,22:POKE 709,68:POKE 708,132
   :RETURN
IT 30 CLOSE #1:OPEN #1,4,0,"K":DIM H$(16)
   ,N$(10),HEX$(20),AN$(20)
CT 40 GOSUB 20:POSITION 4,1:? #6;"hex/dec
   imal"
SN 50 POSITION 0,3:? #6;"CONVERSION PROGR
   AMS"
YR 60 POSITION 2,5:? #6;"hex to decimal?
                        decimal to hex
   ?"
KQ 70 POSITION 2,9:? #6;"(CHOOSE h OR d)"
FU 80 GET #1,K:IF K<68 OR K>72 THEN 70
WB 90 IF K=72 THEN 410
AY 100 GOSUB 20:H$="0123456789ABCDEF"
JX 110 POSITION 0,1:? #6;"  CONVERTS deci
   MAL      NUMBERS TO hex"
RJ 130 POSITION 4,5:? #6;"YOUR NUMBER?":N
   $="":HEX$="":AN$="":TEST=0:POSITION 4,
   7:? #6;"dec:";
UH 140 GET #1,X:TRAP 610:IF X=155 THEN GO
   TO 200
IB 150 IF X=126 THEN N$="":POSITION 10,7:
   ? #6;"          ":GOTO 130
WB 160 IF X=27 THEN GOTO 410
XH 170 IF X<48 OR X>57 THEN 140
AC 180 N$(LEN(N$)+1)=CHR$(X)
WL 190 POSITION 10,7:? #6;N$
OF 195 GOTO 140
HZ 200 N=4294967290:DEC=VAL(N$):POSITION
   4,9:? #6;"hex:":POSITION 10,9
YX 210 FOR X=8 TO 1 STEP -1
ON 220 N=N/16
LY 230 R=INT(DEC/N)
LB 240 IF R>=1 THEN DEC=DEC-(R*N)
OG 250 HEX$=H$(R+1,R+1):AN$(LEN(AN$)+1)=H
   EX$:NEXT X
GL 260 FOR I=1 TO LEN(AN$):TEST=TEST+ASC(
   AN$(I,I)):IF TEST>I*48 THEN GOTO 265
PO 264 GOTO 270
QZ 265 ? #6;AN$(I,I);
GG 270 NEXT I
RA 280 GET #1,F:POSITION 10,7:? #6;"
              ":POSITION 10,9:? #6;"
          "
NG 290 GOTO 130
RW 400 REM HEX TO DECIMAL CONVERSION
TC 410 GOSUB 20
KY 420 POSITION 2,1:? #6;"  CONVERTS hex
      NUMBERS TO dec"
CO 425 POSITION 4,7:? #6;"hex:"
SP 430 POSITION 4,5:? #6;"YOUR NUMBER?":H
   EX$=""
GM 440 GET #1,X:TRAP 610:IF X=155 THEN 53
   0
IP 450 IF X=126 THEN POSITION 10,7:? #6;"
         ":HEX$="":GOTO 430
PG 460 IF X=27 THEN HEX$="":GOTO 100
EL 470 IF X<48 OR X>70 THEN GOTO 440
ID 500 HEX$(LEN(HEX$)+1)=CHR$(X)
WU 510 POSITION 10,7:PRINT #6;HEX$
OK 520 GOTO 440
JW 530 POSITION 4,9:? #6;"dec:"
FK 540 DC=0:HX=0
BA 550 FOR X=1 TO LEN(HEX$)
VX 560 HX=ASC(HEX$(X,X))-48
VN 570 DC=16*DC+HX-7*(HX>9)
MF 580 NEXT X
SM 590 POSITION 10,9:? #6;DC
XU 600 GET #1,F:POSITION 10,7:? #6;"
          ":POSITION 10,9:? #6;"
          "
OL 605 GOTO 430
GC 610 REM ERROR TRAP ROUTINE
CZ 620 GRAPHICS 0:? CHR$(125):POSITION 2,
   10
UD 630 ? "SORRY! THIS PROGRAM LIMITS YOU
   TO A"
UQ 640 ? "DECIMAL INPUT OF 4.2 BILLION OR
    A HEX INPUT OF 20 CHARACTERS!"
WW 650 ? "      (HIT ANY KEY TO RESTART!)
   ":GET #1,R:RUN
```

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new products

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TECHNICOLOR DREAM

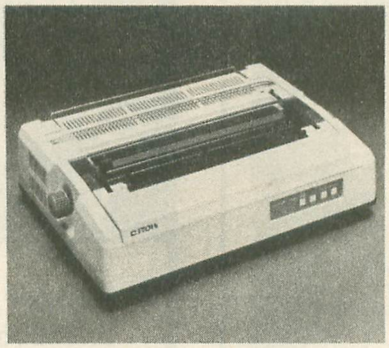
(graphics software)
Red Rat Software Ltd.
11 Fennel Street
Manchester M4 3DU
England
061-835 1055
$26 (approx.), 48K disk

A screen for a canvas, an electronic brush, and all of the colors Van Gogh ever wanted—an 8-bit palette of 256 colors at the same time. 128 filters can be used to mix "new" colors to give over 8 million variations and extend the Atari's graphics to new horizons. Dumps to Epson-compatible printers. Available on disk or cassette. Contact manufacturer for latest $US price.

SUPER 3-D PLOTTER, CIRCUIT DATABASE II

(design software)
Elfin Magic Co.
23 Brook Place
East Islip, NY 11730
(516) 581-7657
48K disk

Super 3-D Plotter ($39.95) is a color display package that draws and animates full-screen, high-resolution color "wire frame" three-dimensional objects in real time at a rate of three to six screens per second. Through a set of natural algorithms, the need for conventional math (sines, cosines, etc.) is eliminated from the 3-D process. Dumps 640×324 resolution graphics to any dot matrix graphics printer. **Circuit Database II** ($12.95) is a joystick-operated, electronic schematic drawing program that allows easy design, editing and disk storage of circuit diagrams using re-defined characters for circuit elements. Prints out on dot-matrix vertical printhead printers.



C. ITOH D10-40

(daisywheel printer)
C.Itoh Digital Products
19750 S. Vermont, Suite 220
Torrance, CA 90502
(800) 423-0300
$949

This 136-column, Diablo 630-compatible daisywheel printer with a speed of 40 chracters per second is claimed to be substantially quieter than previous models. Atari-compatible 8-bit parallel and RS-232 serial interfaces, 8K data buffer.

BALLYHOO

Infocom
(interactive fiction)
125 Cambridge Park Drive
Cambridge, MA 02140
(617) 492-6000
$39.95, 48K disk

If you want to hang around the circus, you've got to learn how to play the game. Get behind the glittery facade of the circus tent to find a mysterious underworld where corruption takes center stage in the latest all-text interactive mystery adventure game from ever-dependable Infocom.

MONDAY MORNING MANAGER

(game)
TK Computer Products
P.O. Box 9617
Downer's Grove, IL 60515
(800) 422-4912
$39.95, 48K disk

Revised version of this statistical baseball game includes 64 major league teams with full 25-man rosters. Owners of the old version may send in their old disk and $15 for an update. Joystick is recommended.

VIDEO TITLE EDITOR

(software)
Softech Group, Inc.
P.O. Box 582
Keego Harbor, Michigan 48033
(313) 851-4925
$29.95, 24K disk

Create titles, credits, birthday messages, colored screens and leaders on your video tapes with your VCR, Atari and this program. No camera or character generator is necessary.

SCRABBIT

(educational game)
Royer Associates
206 Santa Margarita Avenue
Menlo Park, CA 94025
(415) 326-8079
$21.95, 48K disk

Everybody chooses their own level of difficulty, so Mom or Dad can play with the kids and still find this educational word game challenging. Your joystick controls a hopping rabbit that assembles words from letters placed randomly around the screen.

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Flight Simulator II
For Atari computers with 48K memory

From Origin comes the long-awaited sequel to the award-winning Ultima™ III

Ultima IV

Quest of the Avatar



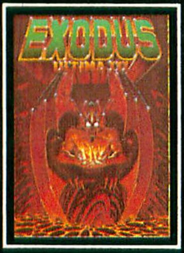
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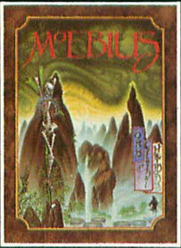
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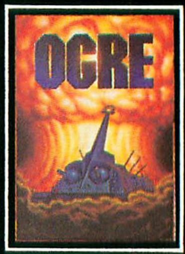
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